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WATER RESEARCH FOUNDATION ACT OF 1985

HEARING

BEFORE THE

SUBCOMMITTEE ON INTERGOVERNMENTAL RELATIONS

OF THE

COMMITTEE ON GOVERNMENTAL AFFAIRS UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

S. 904

TO ESTABLISH A WATER RESEARCH FOUNDATION, TO INCLUDE A WATER RESEARCH PLANNING CENTER AND A WATER INFORMATION CLEARINGHOUSE, TO PROMOTE WATER RESEARCH AND TO DISSEMINATE INFORMATION RELATING TO WATER RESOURCES

JUNE 20, 1985

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WATER RESEARCH FOUNDATION ACT OF 1985

THURSDAY, JUNE 20, 1985

U.S. SENATE,
SUBCOMMITTEE ON INTERGOVERNMENTAL RELATIONS,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The subcommittee met at 2:19 p.m., in room SD-342, Dirksen Senate Office Building, Hon. David F. Durenberger (chairman of the subcommittee) presiding.

Present: Senator Durenberger.

Staff present: Judy Erickson, professional staff member, and Jodi Mathison, chief clerk.

OPENING STATEMENT OF SENATOR DURENBERGER

Senator DURENBERGER. The hearing will come to order. We are here this afternoon to take testimony on S. 904, the Water Research Foundation Act of 1985.

This far-sighted, far-reaching legislation is based on a report from the President's Council on Environmental Quality. It establishes a Water Research Foundation which incorporates two separate but coordinated centers: the Water Research Planning Center and a Water Information Clearinghouse.

The research center is designed to promote and support the water research activities already initiated within the various States and to make recommendations for additional short- and long-term water research needs.

The clearinghouse is established to make credible information available not only to water professionals, but to Government officials, businesses, academic institutions, the public media, and interested citizens.

The Foundation is designed to complement, not duplicate, current Federal, State, and private research efforts.

Over in the Environment and Public Works Committee, I have begun a series of hearings on ground-water contamination, the latest of those this morning. We had two hearings this week. We will have a number in the future, and it is our hope that by the end of the summer, we will have developed legislation to implement a national ground-water protection plan.

I am a cosponsor of legislation we are considering today. I can see how it will improve our understanding of management and protection of ground-water resources. I am, and I am sure a number of my colleagues will share this feeling, concerned to a degree with the price tag that it carries.

[Senator Durenberger's prepared statement follows:]

PREPARED STATEMENT OF SENATOR DURENBERGER

We are here this afternoon to take testimony on S. 904, the Water Research Foundation Act of 1985.

This far sighted, far reaching legislation is based on a report from the President's Council on Environmental Quality. It establishes a Water Research Foundation which incorporates two separate but coordinated centers: The Water Research Planning Center and a Water Information Clearinghouse.

The Research Planning Center is designed to promote and support the water research activities already initiated within the various states and to make recommendations for additional short and long term water research needs.

The Clearinghouse is established to make credible information available not only to water professionals but to government officials, businesses, academic institutions, the public media and interested citizens.

The Foundation would cover the whole range of water resource issues, including groundwater, surface water, estuarine water, atmospheric water, characteristics, usage and institutional factors. It is designed to complement, not duplicate, current Federal, State and private research efforts.

Over in the Environment and Public Works Committee, I have begun a series of hearings on groundwater contamination. We had two hearings this week and we hope to have a number more in the near future. It is my hope that by the end of the summer we will have developed legislation to implement a national groundwater protection plan.

On Monday, we had a witness from the U.S. Geological Survey. Many of you involved in water research know that USGS is the nation's largest scientific and data collection agency concerned with water resources. This year USGS will spend over $90 million on groundwater research and data collection alone!

USGS, EPA and many state agencies are conducting groundwater research, and there is an abundance of raw data. But in many cases, this existing information is insufficient to address new problems or to analyze new aspects of aquifer development or protection. In addition, coordination between these agencies and the states could be improved.

I am a cosponsor of the legislation we are considering today, and I can see how it will improve our understanding, management, and protection of groundwater resources. But I am, and I am sure a number of my colleagues will share this feeling, concerned with the price tag this bill carries.

I look forward to hearing from a number of witnesses, starting with the chief sponsor of this bill, Senator DeConcini, who will weigh the costs and the benefits a water research foundation will provide to water resource problems and future planning.

Senator DeConcini, it is a pleasure to have you here this afternoon.

Senator **DURENBERGER**. I look forward to hearing from our witnesses, particularly the chief sponsor, the author of this bill, our colleague, Senator Dennis DeConcini. He will weigh for us the costs and benefits a water research foundation will provide the water resource problems and future planning.

Dennis, it is a pleasure to have you here this afternoon.

TESTIMONY OF HON. DENNIS DeCONCINI, U.S. SENATOR FROM THE STATE OF ARIZONA

Senator **DECONCINI**. Thank you, Chairman Durenberger. Thank you very much. I want to tell you how much I appreciate your taking time to set these hearings. I know your schedule, and I know you just came from the Senate floor where you were working on an amendment to the supplemental appropriations bill. So to move forward quickly, I have a full statement of some length, Mr. Chairman. I will ask that it be submitted in the record at this time.

Senator **DURENBERGER**. It will be made a part of the record.

Senator **DECONCINI**. I wish to thank you for taking prompt action on S. 904, the Water Resources Foundation Act of 1985. I think it is a very important first step. I certainly commend you and your staff for moving along in this effort. You know probably better than I, through your role in the Environment and Public Works Committee, the demands that water legislation before the Congress this year will place on the State, local, and Federal governments to work together. The effectiveness and the enforcement of every environmental bill we write, including the Clean Water Act, is ultimately tied to or based on something we call "available information."

For the most part, we don't know what available information is or will be at any time in the future. S. 904 is an attempt to deal with that particular dilemma.

It creates an independent research planning center and a national clearinghouse for water-related information. This is not an entirely new concept, and it has been recommended by a lot of people, including those we often ask for advice, the General Accounting Office and the Office of Technology Assessment.

Last year, we asked the Council on Environmental Quality to define and plan the proposed centers, and we have gotten a report back from CEQ with some good ideas and several options on both structure and costs. S. 904 is based on those recommendations and recommendations by the National Water Alliance, which we will hear from later today.

It also includes the suggestions and advice from people around the country. It creates a Water Research Foundation similar in purpose to the National Science Foundation, for both research and information sharing and sets up a program of extramural grants.

Now for the question everyone is going to ask regarding this legislation: "Can we afford to spend more money?" Well, no, we obviously can't afford it. That is why we need this bill. The Federal Government will be spending billions of dollars less than needed for the wastewater treatment grants; it will be spending billions less than needed for the Superfund; it will be spending billions less than needed for the operation and maintenance of Federal dams and water projects; it will be spending billions less than needed for harbors and ports and waterways, and we are just beginning, as you know, to look at our needs for ground-water protection.

Although the Federal Government will be spending perhaps hundreds of billions less than anticipated, the need will still be there and ever growing. We are simply shifting the burden to State and local governments and to the private sector, and we don't have an information and research base to even begin to support all of these efforts.

The amount of fiscal responsibility we are retaining in S. 904 for the Federal Government is nothing compared to the fiscal burden we are shifting to the States.

The second big question which will be asked is: "Should the Foundation be established as an independent agency?" Based on the recommendations of the Council on Environmental Quality report, the National Water Alliance deliberations, and others, the answer is clearly "Yes!" An independent agency would best represent the research interests of all other Federal water entities and State efforts, as well as academic and private sector research.

Furthermore, an independent agency will give water research the central focus and structure it needs. The Water Research Foundation would crystalize and elevate the water research efforts so critical to the Nation's vital resources.

Again, Mr. Chairman, thank you for proceeding with this legislation. I am deeply grateful that you are a cosponsor of this bill.

Senator **DURENBERGER**. Great. Dennis, thank you very much for your initiative in this area, and I thank you. I appreciate it a lot.

[Senator DeConcini's prepared statement follows:]

PREPARED STATEMENT OF SENATOR DENNIS DECONCINI

Mr. Chairman, you know, as I, that our nation's water problems are growing steadily upward on a yearly basis. Not a day goes by when there is not some news account reporting yet another water resource threat somewhere in this country. Whether the water problems are related to drought in the northeast, depletion of groundwater in the midwest or southwest, high water dangers in the Great Lakes, legal disputes over interstate water transfers and Indian claims, or water supply contamination, there is an infinite number of problems but a very finite source of practical answers.

The Congress and state governments respond to resource threats by attempting to craft immediate solutions to address specific problems. But, these solutions are only arrived at once communities have been confronted with a serious threat to the health of our nation's citizens or a threat to the viability of a resource. Instead of taking preventive action, we opt to spend billions of dollars at the Federal level to institute cleanup actions to cope with health risks once they occur. We are actually devoting a very small fraction of the total budget at the Federal level to advance research to expand our knowledge as a nation to better plan activities affecting our water resources. If our water resource problems continue to grow as I have no doubt they will, Mr. Chairman, I believe it is incumbent upon the Congress to take the best course of action now to curb these problems and formulate an effective plan for our nation's future. It seems to me that the best long-term solution to water resource problems is to expand our existing research capabilities and devote the type of resources necessary to overcome our existing knowledge shortfalls.

That is exactly the purpose of S. 904, the Water Research Foundation, Mr. Chairman. S. 904 is the product of studies conducted by the General Accounting Office, the Office of Technology Assessment, the National Research Council, and more recently by the Council on Environmental Quality (CEQ). The CEQ study was mandated by the Congress and completed by the Chesapeake Research Consortium through contract in September of 1984. The purpose of the CEQ study was to consider and define a National Center for Water Resources and to define and plan a National Clearinghouse to disseminate water-related information. S. 904 takes into account the findings of the CEQ study and public comments received and reviewed by the National Water Alliance (NWA), a private non-partisan organization, through a series of symposia held across the country on this very topic. The Executive Director of the National Water Alliance will be testifying today on the NWA's recommendations and findings.

The Council on Environmental Quality report presented a range of options on a Water Research Center and a National Clearinghouse for Information. It described the creation of an independent agency as the ideal option. Mr. Chairman, I think there is no hesitation in the minds of experts that we need to enhance our nation's water research efforts. There may be disagreement over the process we choose to accomplish that goal, but not over the need for additional research capabilities at every level. I would like to take this opportunity to explain why I believe an independent Federal agency is the best process. The Water Research Foundation created under my legislation is similar in structure to and was modelled after the National Science Foundation. The National Science Foundation was established not to dictate scientific policy but instead to support the basic research and related studies that were considered necessary by the scientific community, not the Government. The National Science Foundation is an independent agency which does not conduct its own in-house research but supports, financially and systematically, the innovations of independent institutions. It supplements Federal agency programs and lends cohesion to the many fragments of basic scientific study. Mr. Chairman, I think we could do the nation a great service by establishing a similar independent agency for water-related research. We need to better coordinate and more fully support our water research efforts. The Water Research Foundation will survey and supplement existing water research, determine water resource study needs, and help to determine national long-term research in the applied and basic studies in the legal, scientific and social areas related to the protection, preservation and use of our nation's water resources. The Foundation will incorporate two separate but coordinated centers: the Water Research Planning Center and a Water Information Clearinghouse. The research planning center will promote and support the water research activities already initiated within the various states and makes recommendations for long-term water research needs. The purpose of the Clearinghouse is to make available credible information not only to water professionals but to government officials, businesses, academic institutions, the public and interested citizens. It could easily support educational programs from scholarly symposia to public information publications.

The Water Research Foundation will not duplicate Federal agency or other research efforts but will engage national problems and issues not otherwise allocated by the Federal agency mission-oriented research. It is governed by a Board of Directors appointed by the President and confirmed by the Senate.

As an independent agency, the Foundation will be less political and the funding for its research-related activities will be more certain. The Foundation will have no authority or jurisdiction over other Federal or non-Federal agencies. It will utilize existing research capabilities first. It is not designed to be an in-house research entity. State and local participation in formulating research priorities is allowed in the bill and should be encouraged to maximize efforts at the state and local community levels.

Costs estimated by the Council on Environmental Quality to get the Foundation started are approximately $2 million for fiscal year 1986 and approximately $8 million a year thereafter. The legislation contains separate authorization for extramural research grants and the focus of these grants is to be primarily interregional and interdisciplinary. Mr. Chairman, these estimated costs seem to be very small in terms of the enormous benefits to be derived. Either we pay the costs now for more knowledge, or we pay the price later for our ignorance.

S. 904 has been termed by some as a "forward-looking" answer to our long-term water research problems. Mr. Chairman, I hope the Committee views this legislation as "forward-looking" and takes early action to favorably report this measure to the full Senate.

Again, my thanks to you, Mr. Chairman, for all of your help on this piece of legislation.

Senator DURENBERGER. Our first speaker will be Dr. Mills.

Dr. Mills is the Commissioner on the Council on Environmental Quality. It is great to see you again.

Mr. MILLS. Thank you.

Senator DURENBERGER. I didn't know I was going to see you in this committee. I thought it might be the other one. It is a pleasure to see you here and on this subject.

TESTIMONY OF WILLIAM L. MILLS, MEMBER, COUNCIL ON ENVIRONMENTAL QUALITY

Mr. MILLS. Good afternoon, Mr. Chairman, ladies and gentlemen. My name is William Mills. I am a member of the Council on Environmental Quality. I am very pleased to be here to testify this afternoon before the subcommittee regarding Senate bill 904. This bill calls for the establishment of a water research foundation which will include water research planning and water information clearinghouse functions. According to the authors, it would promote water research and the dissemination of information regarding water resources.

Before I provide my specific comments on the proposed legislation, I would like to just quickly provide the subcommittee with some of the relevant background information and events leading up to Senate bill 904.

Let me say categorically that the Reagan administration is very committed to ensuring that this Nation has adequate and well-managed water resources. We are also fully committed to the development of appropriate vehicles for the collecting and dissemination of quality information relating to water resources. We have and will continue to support all efforts designed to identify problems related to the water resources problems of this country and the deficiencies and the information clearinghouse processes.

In the fall of 1983, Congress appropriated funds in Public Law 98-181 for the conduct of two studies to be carried out under the auspices of the Council on Environmental Quality. These studies were to "consider and define" a national center for water resources research and "define and plan" a national clearinghouse for water resources information. Through a competitive procurement procedure, CEQ, in accordance with the directions from Congress, selected the Chesapeake Research Consortium as the university-based contractor to conduct the two studies in the spring of 1984.

The studies took into account the many public, professional, and governmental aspects of the water resources research and information problems of our country.

In conducting the research, two major observations were made about the status of water research and information programs in this country. First, water resources research is a very mature field with large and diverse existing programs which are fragmented among a number of agencies, organizations, and institutions. Thus, the rationale for creating a new center must recognize the nature of this existing situation.

Second, there are a number of information systems oriented toward either data or documents which, when viewed in the aggregate, appear to meet the information needs of the water resources community. However, we are aware that there are some user needs that are unmet, and this is primarily because users are unfamiliar with the separate water information systems that we have available today.

Thus, what may be viewed as a need and a lack of information is really a question of availability, and this does not necessarily call for a new information system.

The study further identifies and analyzes three institutional arrangements for research functions and three for information clearinghouse functions. The research functions include: Incremental changes to improve the coherence of the existing programs; a center to direct and support extramural research, and an institute to study interdisciplinary water issues. Each of these options is intended to address a stated water research need.

Let me make clear here that these options that we are proposing and that were proposed in the study are not mutually exclusive. Each research center meets a prescribed need and, thus sufficient justification exists for all three to be established simultaneously.

The information options involve the implementation of specific recommendations for improving current institutional arrangements; a national water information referral center; and a system of national, regional, and State clearinghouses incorporating research needs assessment.

The options developed for meeting information needs do not perform distinct, isolated functions. They are really steps along a gradient of services running from improved coordination among existing systems through a center of referring users, to existing information sources, to a system of clearinghouses for actually obtaining information from existing information sources for clients.

A national water information referral system could readily evolve into a national information clearinghouse which then could, on a time-phased basis, serve as the coordinating center for new regional and/or State information clearinghouses.

Our study also concluded that the research and information functions could be combined within a single organizational entity.

Mr. Chairman, I would like at this time to recognize the fine work of the National Water Alliance, with which you are associated. As you know, our contractor attended the meetings of the alliance during the study period and interviewed many of the participants of those meetings. We were in regular contact with James Magner, director of the alliance. We are pleased that the independent study conducted by the alliance reported findings consistent with those in the final CEQ report.

Let me attempt to make clear this afternoon that the CEQ study was not designed to recommend a single "best" alternative for either a research center for information or a research center for an information clearinghouse.

Nevertheless, we conducted four public hearings to hear a broad range of comments on the options proposed. The summary of those comments may be useful to the subcommittee in evaluating the potential need for and acceptability of the Foundation proposed in Senate bill 904.

There is little agreement within the research community that the need and the research needs for a research center are clear. This does not imply that the proposed research centers are without some public support, only that no apparent consensus exists on any one option.

Similarly, some public and agency support was obtained for parts of all three information options. A consensus among public reviewers, however, favored a national water information referral center as the preferred clearinghouse option.

The institutional arrangement in Senate bill 904 is similar to a combination of the national/regional/State clearinghouse system proposed as clearinghouse option 3 in the CEQ study and the extramural research center proposed as option 2 in our study.

I have heard this afternoon on two occasions people say that this legislation is built around the recommendations of the CEQ study, and I am concerned that the impression is given that the CEQ study is the basis for this proposed legislation. Let me state here that the proposed legislation differs from the CEQ study in three important ways.

First, the combined research and information centers are united by an umbrella organization, and that would be, of course, the foundation.

Second, the proposed research budget in Senate bill 904 is many times the amount suggested as appropriate by the CEQ study.

And third, the proposed legislation calls for an entirely new institution instead of using existing institutions as suggested by the CEQ study.

Mr. Chairman, we clearly recognize, as you do, that water research is a very important area as we face increasingly difficult problems of delivering quality and quantity water supplies to our citizens as needed.

We also recognize the penchant of researchers to always have a way to spend more dollars. But quite frankly, our study did not disclose a serious problem that would support the programs outlined in Senate bill 904.

Even with respect to the information clearinghouse function in Senate bill 904, Mr. Chairman, there is already established a coordinated activity in place within the U.S. Geological Survey. The U.S. Geological Survey clearinghouse functions include three systems: the National Water Data Exchange, or Nawdex; the Office of Water Data Coordination, OWDC; and the Water Resources Scientific Information Center.

As I stated earlier, there is a lot of water research already underway in the Federal Government, the States, and the private sector. The proposed research budget of $300 million is essentially equal to the entire total water research budget of the Federal Government. Our contractors were hard-pressed to find any major omissions in the current research program. Problem areas, yes. Areas where additional work is needed, yes. But there was no glaring omissions in the existing system.

In this situation, it seems to me that such an infusion of new research dollars to a new organization in such a short period of time and without a clear problem to tackle would result in extravagance and waste, and a good deal of duplication of effort, and in a few rare cases, there would be a tripling of effort.

I am concerned, as well, that such a large addition of dollars in essentially Federal institutions may tend to place a Federal perspective that ignores the diversity of water problems across the Nation and the rich diversity of capabilities we have presently to deal with those problems.

The institutional design along the lines of the National Science Foundation may tend to minimize this problem. But to the extent that the center can determine priorities and prepare requests for proposals, a narrow, Federal perspective is more than likely.

In summary, we are very concerned that water research provide timely support to water management. However, a new research center need not be established, and accordingly, the administration is opposed to Senate bill 904.

We are indebted to you for this opportunity to address the subcommittee. Thank you very much.

Senator DURENBURGER. Dr. Mills, thank you very much for your testimony. To make sure we have the record clear, we have a large number of questions that I don't know if either of us would want to spend the rest of the afternoon asking and answering, because they are sort of open-ended questions.

What I think I might do is submit them to you. If you are willing to respond to them in writing or have staff respond to them in writing as part of the record today, it would be very, very helpful to the record of the committee.

Mr. MILLS. Certainly.

Senator DURENBURGER. I will just ask you one, which I don't think needs an extensive answer. Throughout your testimony, and obviously, as we look at this legislation from the subcommittee, the question is, What do we need? Do we need more and better water research and research planning? And how do you best accomplish this? I think you pretty well addressed some of what you indicate to be the duplication, the sort of layering issues.

One of the issues that I don't recall you addressing in your oral testimony, unless it was while I was on the phone, is what your thoughts on the State and non-Federal role should be in participating in the kinds of programs contemplated by the Foundation. Do you have some thoughts on that?

Mr. **Mills**. Essentially, we have 54 water resources research institutes around the country, and we have many other outstanding programs at universities and at research foundations that are not identified as water research institutes.

When you couple this tremendous effort with the efforts on the part of the Federal Government and State government and large municipalities, we have far more than enough capability and talent and, in my opinion, we have almost adequate resources to adequately address all of our water resources research problems.

The Chesapeake group was very hard-pressed to find glaring areas of deficiency. We found areas where, certainly, we would need to focus more attention and fine tune our efforts and coordinate our efforts better, but a foundation to provide a very large budget and many new programs and many new thrusts in the water resources field, in my opinion, is not needed when you consider that we spend over $300 million now of Federal money on water resources. That figure is much higher when you consider the addition of the sums that are spent by the private sector and by the municipalities in some States.

Senator **Durenberger**. Very good. Thank you very much for your testimony. I appreciate it.

[Mr. Mills' responses to written questions submitted by Senator Durenberger follow:]

CEQ Responses to Questions from Dave Durenberger regarding S. 904, the Water Research Foundation Act of 1985.

1. The question we are facing is primarily one of whether we need more and better water research and research planning, and whether that can be best accomplished through an independent agency.

   a. QUESTION: Would the research funded through the water research foundation duplicate current programs?

   CEQ RESPONSE: There are a large number of water resources research entities, not only in the Federal government, but also in the States, universities and the private sector. In the Federal sector alone, water research expenditures are estimated to be in excess of $300 million annually. An assessment of water research in 1981 by the National Academy of Sciences, National Research Council, found only one priority area (institutional arrangements for water allocation) that was not being addressed to some degree by one or more agencies.

   A sudden massive infusion of dollars into a new institution when there are no glaring gaps in research can only result in duplication of current programs.

   b. QUESTION: Isn't it possible that it will add another layer of federal bureaucracy to federal research programs?

   CEQ RESPONSE: Yes, it will clearly add one more unneeded bureaucracy to a field of many. There already exist the focused water research programs of the several agencies (eg. Environmental Protection Agency, Corps of Engineers, and Geological Survey) oriented to the research support of the agencies' missions and the more general research funding agencies (such as the water research program in the U.S. Geological Survey under P.L. 98-242 and the National Science Foundation). The proposed foundation would become yet another funding agency.

   c. QUESTION: We have a lot of independent agencies -- do we need another?

   CEQ RESPONSE: The answer, quite simply, is no. In the CEQ study on water resources, the contractors stated that a research center of the type envisioned under S. 904 should be "independent" of the mission agencies so that it could maintain a broad national perspective in determining research goals. But a research center could be independent either as an independent agency, or attached to an existing agency with appropriate safeguards to insure independence. The fact remains, however, that any type of new independent agency functioning in the proposed manner would be duplicative and is not needed.

2. QUESTION: What institutions could be used in developing a clearinghouse system?

   CEQ RESPONSE: Several entities could be used. They include existing Federal data and information clearinghouses (eg. in the Geological Survey, National Oceanic and Atmospheric Administration and Environmental Protection Agency), private sector clearinghouses (such as the Acid Rain Clearinghouse and an information system operated by the American Water Works Association), and the existing water research institutes in each state.

3. QUESTION: What do you see as the highest priorities in water research needs?

   CEQ RESPONSE: Some of the areas of continuing research interest on a regional level are groundwater contamination, groundwater conservation and recharge, and toxic substances and their impact on water supplies. More emphasis should be given to synthesis of the many research findings of the past. Again, as is the case now, these emerging issues should be addressed not only by the Federal government, but also by the States, universities, and the private sector.

Senator DURENBERGER. We now have our panel: Dr. Joseph Rossillon, president of the Freshwater Foundation; Ernest Smerdon, the chairman of the Water Resources Committee of the National Association of State Universities and Land Grant Colleges; and James J. Magner, executive director of the National Water Alliance.

Your statements will all be made part of the record. You may now proceed to summarize them in five minutes. We will go first with Dr. Rossillon.

Joe?

TESTIMONY OF JOSEPH ROSSILLON, PRESIDENT, FRESHWATER FOUNDATION; ERNEST SMERDON, CHAIRMAN, WATER RESOURCES COMMITTEE, NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES; AND JAMES J. MAGNER, EXECUTIVE DIRECTOR, NATIONAL WATER ALLIANCE

Mr. ROSSILLON. Thank you, Senator. You have my testimony for the record. My name is Joe Rossillon. As you know, I am president of the Freshwater Foundation. The Freshwater Foundation is a nonadvocacy, nonprofit foundation which generates and distributes funds to support freshwater research—primarily related to water quality—and information education programs designed to translate water issues and scientific information to the general public.

It has been in existence for 16 years, and it is in that capacity that I would like to speak for Senate bill 904. One of the reasons this bill was generated was because of a concern in the United States for a potential water crisis. When we talk about a water crisis, we are not talking about a massive flood or a massive drought. We are really talking about the fact that the social, political and economic structure, the infrastructure that supports the water system in the United States, is in a near state of chaos.

From the social standpoint, the chaos arises from the fact that the people in the United States have always been under the assumption that their water quality was safe and acceptable to drink, and now across the United States, we have increasing numbers who consider their supply neither safe nor acceptable.

From a political standpoint, the management structure that maintains our water supply is hopelessly obsolete. The system was designed at a time when we had not enough people and way too much water, and it is all designed to get rid of water. Now the problems across the United States are chronic shortages. The second problem is that both water systems or governing systems in the United States, both eastern and western law, are based upon states rights, and now the question up for debate in the supreme court of the southwest is about the State authority over ownership.

From an economic standpoint, the economy of the United States is based upon the principal of free water. We have always paid for handling, storage, supply. But the water at the source has always been free. Now, with the theory of privatization, this philosophy is under attack.

To divert a crisis in this social, political and economic arena, I think what is needed is a significant change, a change in the way that we perceive and use our water supplies. Now, the basis for all change is information, or new knowledge, and education—which is really people involvement in that new knowledge.

That is where the water resource planning center and water information clearinghouse can come into play as vehicles for change. Very quickly, how do I see the changes occurring? In two ways: No. 1, I think in the next 20 years, we are going to find a significant reduction in use or a need for water use reduction in the United States as much as 20 percent.

In fact, I believe that motto for the 1990's is "reduce or reuse; the choice is yours." If you cut back on use, that requires new technology and new techniques for managing urban water. If you recycle, it requires a whole new attitude with people and acceptance of the fact that recycled water is really OK to use.

The second major change is going to occur in the system of establishing priorities. For the first time in the United States, I think our water supplies are going to have to be managed on the system of priorities. As Governor Lamb from Colorado said: "Governments are very good at distributing pleasure. They're not very good at distributing pain." When you talk of priorities, you are not talking about what are we going to do; you are talking about what we "aren't going to do—the bottom of the priority list, or distributing pain. It is our belief that such decisions are going to need to occur on a regional basis.

Two nice examples of regionalism occurring very recently are the Great Lakes Charter and the International Coalition of the Red River Valley. The significance of the Great Lakes Charter is the ultimate realization that no individual State can manage a watershed. All those within the watershed must band together to determine the actions or uses that are to the best advantage of the entire region, and as a region, what things should be done.

The International Coalition of the Red River Valley was initiated primarily by mayors throughout the valley, because they were trying to find a way to be able to live and work in the valley and not flood Winnipeg.

So they banded together to determine, first of all, what things can be done that are not counterproductive to the valley; second, what things are counterproductive that should not be done; and third, how do you keep from doing those counterproductive things. Again, the "whole" took precedent over the "parts."

If we accept the concepts and those are the two issues, where do we start? I think an "accessibility to" and "an understanding of" new information is the key to the change. I think that is where the Water Research Planning Center and the clearinghouse can come into play.

When I think about the research planning center, I don't think of the duplication of the excellent biological, chemical, and hydrologic research that Dr. Mills was talking about. Rather, I refer to a network of regional centers that can address the needs for restructuring the governance and management of water resources from the social, political, and economic standpoint.

These regional centers must address these questions. What must this region do to maximize the use of our water resources in this region while minimizing the impact on the natural system to assure a continued balance of that system?

Second, what are the things that we can do and the things that we won't do because of water constraints?

And third, what is needed to make those decisions and to manage the results? That is the research center.

The clearinghouse I see as a regional crisis center. In a time of crisis, whether it is natural or manmade, a crisis center is needed. It serves as a place to go to get available information. It is the place to go to ask, "Why is that important to me?"

It should not serve as a storehouse, but as a source of where to go for information and the meaning of the information. I would like to submit as an example copies of a special report developed by the Freshwater Foundation called "Water Management in Transition in 1985." It is a nice example of the kind of service the clearinghouse could provide.[1]

Senator **Durenberger**. That will be made a part of the record.

Mr. **Rossillon**. Conclusion: Water resources across the United States are as diverse as they are universal and perpetual. A megacenter will do little, in my opinion, to sensitively interface between the diverse needs of the people in the United States and the critical local issues that must be addressed.

What the proposed centers should be is a network of regional "area sensitive" centers that interface with each other for information and guidance and with their constituencies for agenda and priority.

Wouldn't that be a wonderful way to help alleviate a potential water crisis across the United States?

Senator **Durenberger**. Thank you.

Mr. Smerdon.

Mr. **Smerdon**. Thank you very much. I am Ernest Smerdon. I am director of the Center for Research and Water Resources at the University of Texas, but I am here as chairman of the Water Resources Committee of the National Association of State Universities and Land Grant Colleges. That organization has 144 public university members. I also am vice president of the Universities Council on Water Resources, which has 80 members, public and private. I should first mention that we had two presidents who were coming when we thought that this hearing was going to be held on Monday, Dr. Cavazos of Texas Tech and Dr. Fred Davison of the University of Georgia. They are sorry they can't be here, but they have submitted statements in support of this bill.[2]

Senator **Durenberger**. And those statements will be made a part of the record.

Mr. **Smerdon**. My statement mentions many problems that need research. I will not take time to discuss those, because they are in the statement. But we certainly do have problems that portend serious, almost crisis-like situations for the United States unless these problems are addressed.

These include ground water pollution, handling of toxic waste, acid rain, and many others. The ground water supply that once provided a buffer is being overdrafted in the western United States, and Dr. Cavazos addresses that issue.

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[1] See p. 82.

[2] See p. 69 and 72 respectively.

So I think we can recognize that virtually all States have very serious water problems, and these cover a broad range of individual problem areas. I think it is tremendous that the National Water Alliance is starting to hammer out a consensus on national water concern. The next step is to implement a research program and an information transfer program which will address these issues, and Senate bill 904 provides a mechanism for doing this.

It is important, though, that the necessary prevention of duplication of research and coordination be included, and I think that I should stress that particular point. Clearly, water is a problem of critical importance in the Nation. In recent years, Congress has faced a recurring question of what is the national role in terms of water resources research? The National Association of State Universities and Land Grant Colleges and the Universities Council on Water Resources have gone on record, through the years, in recommending that we need more appropriations for research so that we can expand the knowledge base which is so critical to solving the future problems.

But the appropriations which have resulted, in our judgment, have not been adequate. We hear figures bantered about in terms of the dollars spent for research. Well, research sometimes is defined in different ways, and we must recognize that.

I do not think that we have enough research that is directed at gaining new levels of understanding in ways of handling problems, and the toxic waste problem is a good example.

The pay off from research is an issue to which we have given some thought. In 1981, after testimony before Congressman Yates of the House Appropriations Subcommittee, he asked us to provide information on the economic return from research. We assembled a panel which included 10 representatives of universities, including economists, and we collected data from 80 universities, including all 54 State institutes, and my statement provides additional information on that. But recognizing that determining benefit is somewhat difficult, we found that the benefit-to-cost ratio from research ranged from certainly well over one up to, in several cases, a ratio of several thousand.

It is remarkable what the benefit is. I would like to close by making this statement concerning research. It seems to me that research is much like insurance, and it is the kind of insurance that the Nation buys to try to assure that the future problems are not unnecessarily severe. Research pay off is of two types: In one type, sometimes we prevent a problem from ever coming into being or make it much less severe than it would be. In the other case, and I think this is equally important, is research can provide a mechanism for economically, and I stress that, economically addressing critical water problems.

Senate bill 904 appears to be well-structured and an effective mechanism to address future water research needs, if the necessary coordination and these other things can be brought into play.

One thing is certain: The Nation's water problems are not going to become less serious unless they are addressed, and we are extremely pleased to see the sponsors of this bill at least recognizing that water resources research is extremely important and that it must have increased attention in the future through one mechanism or the other.

A final comment: You might be interested in knowing that the National Federation of State High School Associations has selected this year as its topic for the national debate topic, "Resolved: That the Federal Government Should Establish a Comprehensive National Policy To Protect the Quality of Water in the United States."

So I am sure that high school students are going to be giving a lot of attention to water during the next year, and I think that is great. Thank you very much.

Senator DURENBERGER. Good. It beats the other things they give their attention to. [Laughter.]

Thank God my last one finally graduated this year. [Laughter.]

Jim Magner, you are the third member of our panel, and we appreciate your appearing.

Mr. MAGNER. I am Jim Magner, director of the National Water Alliance, and I would like to thank you, Mr. Chairman, on behalf of the National Water Alliance for giving me the opportunity to testify at these hearings on S. 904, the Water Research Foundation Act of 1985. I would like to submit, as you suggested, my full statement for the record and simply summarize some of the major points.

The statement we are submitting outlines the National Water Alliance programs in 1983 and 1984, which culminated in the recommendation of policy resolution which express strong support for current research programs and for a national water research council. That resolution was accompanied by a legislative summary in the form of a legislative draft. The national water research council described in that draft is very similar to the water research foundation proposed in S. 904.

There were, of course, additionally, a number of suggestions as to how the policy resolution of the alliance board could best be implemented, and alliance members are encouraged to make independent comments and recommendations concerning the specifics of S. 904 directly to the committee.

Mr. Chairman, from the hundreds of hours over the past year-and-a-half that I have spent talking to experts about water research, there are two comments in particular which probably sum up the whole situation. Incidentally, the two comments were made by officials in the administration. One was we have a lot of data in this country, but we don't seem to have much information; and the second one was, we simply don't know what we know and what we don't know about water.

This is certainly not the fault of the Federal agencies or anyone else, for that matter. The agencies properly pursue missions and priorities set by Congress. As a country, we have simply not set the generic mission of having someone take an ongoing inventory of what is being studied and by whom. We don't have a mission of looking beyond the latest crisis which confronts the Nation, a mission that recognizes the legal, social, political, institutional, and financial aspects as well as the science and technical aspects of water problems.

In final analysis, the major question is not if something should be done, there is enough agreement on that, but how it should be done and who should do it. We believe the best answer is S. 904. It creates a permanent but rotating panel of experts from around the country, appointed by the President, but recommended by their peers and allows them to use their collective judgment in water research planning.

This is very similar in concept and structure to the National Science Foundation. It is very similar to the options presented to Congress in the report prepared by the Cheaspeake Research Consortium for the Council on Environmental Quality. It is probably closest to option No. 2, which is referred to in the report as the ideal extramural research center.

What makes it ideal, Mr. Chairman, is with its independence and extramural grant authority, it would be effective. It would actually work. The ranking alternative to an independent agency is an advisory committee of some kind. But I would suggest that the Federal landscape is littered with the bones of advisory committees that died very lonely deaths. Unless the committee or a board could actually follow through on some of its own advice, it will be ignored.

The dimensions and the role of the foundation in support of all Federal agencies, and local efforts in all of the States, requires independence. There are now a fair number of independent agencies which I am sure have important national goals, but I doubt that many, if any, are as important to the whole country as the water research foundation will be.

In closing, Mr. Chairman, I would like to point out that the National Water Alliance is not a research organization and would not participate in the Foundation Programs. But that is not to say that the alliance would not benefit from its research. Participants in our very first conference agree that developing policy recommendations relies on whatever knowledge and information happens to be available. The water research and information dissemination, supported through the foundation, would add a great deal of cohesion to our national research effort and make the Nation's job of protecting and managing the Nation's water resources a lot more attainable.

S. 904, the Water Research Foundation Act, raises water research to its full level of importance in this country and gives recognition to water as being central to our national well-being.

Again, thank you, Mr. Chairman, for the opportunity to testify.

Senator **Durenberger**. Thank you all very much.

Let me ask each of you to respond to the same question that I asked of Dr. Mills. That is, we have talked a lot about the Federal role in this.

What should the State and the non-Federal role be in participating in the Foundation Program as proposed? What specifically, or is there a role for State agencies and for non-Federal entities?

Let's start with Dr. Rossillon.

Mr. **Rossillon**. I firmly believe that if necessity is the mother of invention then adversity is the father of opportunity. I think you will discover that as the opportunities exist, the non-Federal or the private sector will, through "wisely selfish motivation," become involved in a lot of the research, the applied research that is necessary and a great deal of the slack can be picked up if we look at research as income potential rather than as a pure research expenditures, as we did sometime in the past. We are finding that to be the case.

Senator **DURENBERGER**. Mr. Smerdon?

Mr. **SMERDON**. I think that the States are already accepting increased responsibility in looking at the issue. However, water problems transcend political boundaries, and I think it is worthwhile to look at what has happened in the last 50 years. It so happens that this September, I believe it is, will be the 50th anniversary of Hoover Dam. I venture to say that the development of this Nation as a strong industrial and agricultural Nation would not have occurred if it had been left up to the individual States to do the research to develop the necessary water programs which, at that time, were primarily the development of supply.

Now we are facing the situation of fine tuning the management of the water system, a problem which, again, crosses State boundaries. So it seems to me that it is much more efficient for the Federal Government to play a strong leadership partnership role with the States in solving these problems. Certainly, the universities, all of the universities, are most anxious to participate in this in any way that they can.

Senator **DURENBERGER**. OK. Jim?

Mr. **MAGNER**. I think the major benefit role of this bill would be to give researchers in the various State and the private sector and others, a direct say in water research planning in this country. They would be on the board of directors and have a direct part in planning research and observing and approving the role of the two centers.

Additionally, even though there is an authorization for grants, which is similar to the National Science Foundation, that is just an authorization, not necessarily a funding target. It may not be appropriated at that full amount. Even if it were, there would still be other research needs, and there would be a need for matching funds and other participation from the States and other entities and other research opportunities needed in addition to this.

But all these would be coordinated in some way. I think that is the function that this provides. It gives information to people, but it doesn't mandate coordination. It doesn't force the agencies to do anything. But it gives the information that the researches and planners out there can use to supplement instead of duplicate what other people are doing.

Senator **DURENBURGER**. Gentleman, thank you very much for your testimony.

[The prepared statements of Messrs. Rossillion, Smerdon, and Magner follow:]

TESTIMONY BEFORE
THE SUBCOMMITTEE ON INTERGOVERNMENTAL RELATIONS
ON SENATE BILL S.904,
THE WATER RESEARCH FOUNDATION ACT OF 1985

By Dr. Joseph P. Rossillon, President
Freshwater Foundation

My name is Dr. Joseph P. Rossillon. I am president of the Freshwater Foundation. The Freshwater Foundation is a non-advocacy, non-profit foundation which generates and distributes funds to support freshwater research (primarily related to water quality), and information and education programs designed to translate water issues and scientific information for the general public.

It is in that capacity that I would like to speak in support of Senate Bill S.904 to establish a Water Research Foundation, to include a Water Research Planning Center and a Water Information Clearinghouse, to promote water research and to disseminate information relating to water resources.

Introduction

When we speak of the impending water crisis that we must be prepared to face in the United States, we are not speaking of massive flooding or drought, the common problems associated with water. We refer rather to the fact that the social, political and economic structure that sustains the water system in the United States is in a state of near chaos.

From a social standpoint, the people of the United States are accustomed to safe, acceptable, drinkable (potable) water supplies. Yet today no water supply in the United States is guaranteed both safe and acceptable.

From a political standpoint, the management structure for water is based on surplus supply. This structure is woefully obsolete, given the fact that the dominant issue across the United States is recurring water shortages. In addition, the present basis for water law in the United States -- state ownership -- is an issue currently under consideration by the Supreme Court.

The economic structure of the United States is based upon "free water." Historically, payments for water have been for handling, but water at the source has always been free. Now, with the discussion of privatization of water and the increasing number of attempts to produce and sell water supplies, the economic structure of water is also suddenly under threat of major change.

To ignore these indicators would assure a national water crisis similar in scope to the one we went through with energy.

To avert a national water crisis will require major change - change in attitudes; change in behavior; change in water management.

The basis for change is information - new knowledge and education (which is"people involvement" in and with the new knowledge).

This need for change is the basis for the need for the Water Research Planning Center and the Water Information Clearinghouse.

How will change occur?

Reduce or reuse:

I am convinced that, in the near future, the entire United States will need to cut back on water use by 20%, and the motto for the 1990s may well be "Reduce or reuse, the choice is yours." If such a prediction is correct, the entire population must be prepared for major modifications in lifestyles.

If the choice is reduction of volume, two opportunities occur. First, new technology must be developed at all levels of the water delivery system to provide for cut-back, including reduced-volume technology, alternative sluicing techniques and new techniques for handling water.

In addition, if a water surcharge is introduced, any reduction in use becomes an income generator.

If the option is to recycle, other opportunities occur. New storage technology and new storage philosophies must be developed. In addition, the critical issue of attitude change must be addressed, and consumers must be made comfortable with the idea of using water more than once. Finally, if we intend to recycle our water supplies, it is implicit that those supplies be "specific-use" safe. Although not all water supplies need to be potable, each must be non-threatening or non-hazardous for its intended use.

Regionalism:

The key to management change related to water in the next 15 years will be the concept of regionalism. This concept is based upon the assumptions that water must be managed within a region, that water will probably have to stay primarily within that region and that regions themselves will have to determine what they will and, more important, what they won't be able to do. In other words, no longer can everyone do anything they want to do wherever they want to do it. Instead, the time has come for a system of priorities to be established -- and for cooperative development and acceptance of such a system.

Two recent examples of this cooperative spirit are the Great Lakes Charter and the International Coalition.

The significance of the Great Lakes Charter is ultimately the realization that no individual state can manage a watershed. All those within the watershed must band together to determine what actions or uses are to the best advantage of the entire region, and as a region, what things are best not done.

The International Coalition, initiated primarily by mayors throughout the Red River Valley, is banding together to determine (1) what things can be done that are not counterproductive to the Valley, (2) what things are counterproductive that should not be done, and (3) how to keep from doing those "counterproductive things." Again, the whole takes precedence over the parts.

Where to start ?

An accessibility to and an understanding of new information is the key to change. For regional water planning to work, specific regional data is needed along with the ability to manage the data. Enter the concept of the Water Research Planning Center and the Water Information Clearinghouse.

Water Research Planning Center:

When I think of a Water Research Planning Center, I do not think of a duplication of the excellent biological, chemical and hydrologic research now in process across the United States. Rather, I refer to a network of regional centers that can address the need for restructuring the governants and management of water resources from a social, political and economic standpoint.

The regional centers would address these questions: "What must this region do to maximize the use of our water resources in the region while minimizing the impact on the natural system, to assure a continued balance in that system?"
"What are the 'things that we can do' and the 'things that we won't do' because of water constraints?" "What is needed to make those decisions and to manage the results?"

Water Information Clearinghouse:

When I think of a Water Information Clearinghouse, I think of a regional "crisis center."

In time of crisis, be it natural or man-made disaster, a crisis center is needed. This center serves as the place to go for the best available information at the time. It serves as the place that translates what we know into "Why is that important to you?" The clearinghouse proposed in this bill should serve in that capacity. It should not serve as a storehouse, but should serve as a source of "where to go for information" and a source for "what that information means".

I would like to submit a copy of our special report titled Water Management in Transition 1985 as an example of the kind of service such a clearinghouse could be performing.

Conclusion

Water issues across the United States are as diverse as they are universal and perpetual. A mega-center will do little, in my opinion, to sensitively interface between the diverse needs of the people of the United States and the critical local issues that must be addressed.

What the proposed centers should be is a network of regional area sensitive centers that interface with each other for information and guidance and with their constituencies for agenda and priority.

Wouldn't that be a wonderful way to help alleviate a potential water crisis across the United States?

TESTIMONY

on

S.B. 904

before the

Subcommittee on Intergovernmental Relations
United States Senate

by

Ernest T. Smerdon

Chairman, Water Resources Committee
National Association of State Universities and
Land Grant Colleges

and

Vice President, Universities Council on Water Resources

June 20, 1985

I am Ernest T. Smerdon, Director of the Center for Research in Water Resources at The University of Texas at Austin. I am grateful for the opportunity to testify here today on behalf of two university organizations which represent major universities with extensive education and research programs in water resources. I am chairman of the Water Resources Committee of the National Association of State Universities and Land Grant Colleges (NASULGC), an organization with 144 public university members. I am also Vice President of the Universities Council on Water Resources (UCOWR) which has over 80 member universities, both public and private, and eight affiliates. Today I speak on behalf of these two organizations.

First, I should mention that two university presidents were scheduled to present testimony on behalf of the Water Committee of the Association and the Council. However, when the date of this hearing was changed from June 17th to the 20th, previous commitments prevented Dr. Lauro Cavazos, President of Texas Tech University, and Dr. Fred Davison, President of the University of Georgia, from being with us. The statements in support of S.B. 904 prepared by these distinguished university leaders have been sent to the Subcommittee. Both are deeply committed to water resources research and regret that they cannot be here in person. I should note that the summer meeting of the National Collegiate Athletic Association is being held in New Orleans at this very time and several other university presidents who might have come before you were also committed.

Now, I will speak to the issue of water research and to S.B. 904, which would establish a Water Research Foundation, including a Water Research Planning Center and a Water Information Clearinghouse.

Water is a wondrous substance. It is essential to life and man cannot live for long without it. It is not only essential to the production of food, but without it we could not have a thriving industry. Water, per se, cannot be destroyed. And yet, except for war, man's lack of understanding of how to control and safely manage water may have made it the source of more of his ills than any other cause. I will illustrate with a few examples.

When water becomes contaminated it can be transformed into a deadly mixture. In years past, it was common for terrible diseases to plague mankind and quite often these diseases were conveyed with our water. But through research we learned sanitation and how to disinfect our drinking water, largely eliminating that problem in this country. However, it is still a serious problem worldwide in less developed countries.

We have always had concern for water shortages and drought. Famines have often resulted from prolonged droughts. Witness the recent starvation in Ethiopia and in Chad only a few years back.

We are again coming to fear the health dangers of pollution, particularly pollution of ground water with powerful chemicals whose effects may not manifest themselves immediately, but the end result can be irreversibly deadly. Many water wells in the U.S. have already become contaminated by pesticides and the various states are constantly trying to address this issue. I just read that Massachusetts has joined several states, such as Florida, New York and New Jersey, in restricting the use of Temik, a pesticide widely used in New England by potato growers. California has had recent evidence of groundwater pollution and bottled water sales have picked up in many areas as a precaution.

The problems of handling toxic waste continue to be troublesome. The public image of the Superfund programs which were to clean up toxic waste dumps has suffered. Now, according to a recent issue of Science, the Office of Technology Assessment estimates that the toxic waste dump clean-up costs will be enormous, and to do the job right may take as long as 50 years and cost several hundred billion dollars. For the most part, toxic land fills "cleaned up" are merely moved from one place to another. A major public problem is the fear of leakage of the toxic materials or leaching to the ground water. Today, the public is increasingly concerned about danger to health, especially from contaminated ground water. More research is needed on the fate of toxics in the ground water and how these compounds move with the ground water and what can be done about them. We need more work on effective methods to clean up ground water that may have become contaminated.

The acid rain issue is creating international tension between the U.S. and Canada. It is both a water pollution and an air pollution problem. However, it will not go away without research. Attention is needed on the water chemistry of acid rain and its effects.

I understand that the Northeast is bracing for a drought. The Delaware River Basin Commission recently declared a drought emergency, the third in twenty years. Pennsylvania Governor Thornburgh has called the current dry spell "the most critical water shortage in the Delaware basin in this century," and he proclaimed a drought emergency in 16 counties. New Jersey Governor Kean has ordered water use restrictions for 122 communities in 10 of 13 Delaware basin counties. New York City Mayor Koch also recently has ordered emergency measures.

Oftentimes, we in the Southwest think we are the only ones facing water shortages, but that isn't always the case. However, historically we have had more water disputes because of the chronic water shortages of the past. The recurring water dispute situation is not likely to change because the water supply situation is becoming more critical each year. The ground water that once provided a buffer in many areas is now being used faster than it is being replenished, particularly in the West and Southwest.

Virtually all of the states are facing water problems of one sort or another. The problems range broadly, including supply problems, economic costs of water, jurisdictional and other legal problems, water management issues, and both ground and surface water pollution. The public is aware of these problems and the need for attention to them. In fact, the National Federation of State High School Associations advises us that the issue selected by popular vote as the national high school debate topic for the coming year was, "Resolved: That the Federal government should establish a comprehensive national policy to protect the quality of water in the United States." No doubt, national water issues for the first time are destined to receive major attention by the younger generation.

The National Water Alliance is a good start in trying to hammer out a national consensus on water issues. This is a worthwhile step in getting the essential input on water problems from the leadership in the nation. The next step is to implement an organized plan to address the water problems through research and information transfer. Senate Bill 904 provides a mechanism to accomplish this, if the funds envisioned are forthcoming. There is a need to assure that the program does not promote unnecessary and costly duplication of existing effort and programs. Moreover, in this time of tight budgets, it is essential that the costs of program administration are as low as possible, thereby enabling the lion's share of the funds to go for actual research and water information transfer.

I note the provision for having the eleven member Board of Directors appointed by the President and approved by the Senate. I presume this approach is patterned after the National Science Board and the National Science Foundation, which has proven to be a rather successful model and one that has led to overall high quality research. It offers an approach to assure that there is an external direction and oversight element in the water research and information transfer operation. Hopefully, it will help to minimize the potential for bureaucratic stagnation of the operation. Also, hopefully, the coordination among the several Federal mission focused agencies with interest in water will be accomplished.

We hear much about the deteriorating infrastructure and the associated problems the U.S. faces. The water infrastructure problems are serious and repair of this infrastructure will be costly. Estimates of the capital cost to rehabilitate the urban water distribution systems in the U.S. are on the order of $15-110 billion (1972 dollars) over the next twenty years (Choate and Walter, 1981). The EPA has estimated that the amount required to clean up the nation's waters will total $168 billion—$106 billion for sewer and treatment plant construction and $62 billion for pollution control.

Where will such sums come from? Research and better use of water information offers a considerable potential to save money in accomplishing the things that must be done. The challenges of the last half century (the period of time since Hoover Dam was completed) pale by comparison with the challenges we face over the next 50 years.

Clearly, the water problems of the nation are critical. Moreover, they must have greater research attention if these problems are not to create serious and economically damaging consequences. In recent years a recurring question has been whether Congress has responsibility to address the nation's water problems and, if so, what is the best mechanism. Both the National Association and State Universities and Land Grant Colleges and Universities Council on Water Resources have gone on record as encouraging greater Federal responsibility in implementing a comprehensive national water research program. Through the years, in testimony before Congressional committees, we have urged reauthorization of enabling legislation supporting research through the old Office of Water Resources Research and its successor agencies. Only three months ago, we testified in support of the appropriation under the Water Resources Research Act of 1984. But the appropriation is not adequate to address national water research needs. One main problem for that program is that the low level of funding has not provided an opportunity to address many of the critical problems in the nation. Nor has it been possible to involve the broad expertise existing in many of the universities in the nation because of the inadequate level of funding which has existed for many years.

A proper question that must be asked concerns the potential payoff from research and water information clearing house activities that potentially might be supported under the Water Research Foundation, were it approved and adequately funded? It is never possible to assure any given future return from research. However, a number of estimates of the value of past research have been made, recognizing that some intrinsic values are impossible to quantify, like the beauty of an unpolluted stream.

The value of avoiding health damage from polluted water is very great, but it is also difficult to quantify.

In 1981, at a hearing before his Appropriations Subcommittee, Congressman Yates asked the National Association of State Universities and Land Grant Colleges to determine the economic return from previously supported water research. Data of this kind are not readily available because it is so very difficult to determine the return from research. For example, what time period is appropriate to be used? Nonetheless, a team of university experts, including economists, was assembled to examine the economic return from water research, using information provided by 81 universities, including the 54 water research institutes. The team members represented ten universities and included the Chairman of the Water Resources Committee of the National Association of State Universities and Land Grant Colleges, the President of the Universities Council on Water Resources and the Chairman of the National Association of Water Institute Directors (NAWID).* I served as chairman of the group.

The payoff from research was shown to vary widely. In the completed projects reviewed, the benefit to cost ratio ranged from a low of approximately two in a couple of cases, up to a ratio of well over a thousand for several projects. The analysis of the projects involved looking at the research findings, identifying the users and applications, determining the total cost of the research including non-Federal contributions, estimating the benefits of the research, and assessing the overall impact of the research.

Research and good information transfer are much like insurance in that they are ways of providing protection to assure that future events related to water resources will not create unnecessarily serious problems. The payoff from research potentially is of two types. First, good research can prevent some kinds of problems from occurring or ever becoming serious. Second, research can help provide economical solutions to problems that already exist. S.B. 904 apears to be well structured and could provide an effective mechanism for this nation to address its future water research needs, provided it is funded at an adequate level. However, for the program to be fully successful, it should provide a mechanism to encourage the effective coordination among the many Federal agencies involved in water matters.

One thing is certain. The nation's water problems are not going to become less serious unless they are addressed with an effective national water research program. We badly need a stronger national water research program to help expand the knowledge base to solve water problems. We are pleased to see the interest of the sponsors of S.B. 904 in searching for a mechanism to effectively address national water research and water information transfer needs.

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*Membership of the team included: David Allee, Cornell University; Thomas Bahr, New Mexico State University; Marvin Bond (then Chairman of NAWID), Mississippi; Gordon Chester, University of Wisconsin-Madison; John Frey, Pennsylvania State University; Douglas James, Utah State University; Russell McGregor, NASULGC; Ronald North (then President of UCOWR), University of Georgia; Ernest Smerdon (Chairman, Water Resources Committee of NASULGC), University of Texas at Austin; and William Walker, Virginia Polytechnic Institute and State University.

S.904; WATER RESEARCH FOUNDATION ACT OF 1985

TESTIMONY OF JAMES J. MAGNER
EXECUTIVE DIRECTOR
NATIONAL WATER ALLIANCE
BEFORE THE SENATE COMMITTEE OF GOVERNMENTAL AFFAIRS
SUBCOMMITTEE ON INTERGOVERNMENTAL AFFAIRS
JUNE 20, 1985

Mr. Chairman, on behalf of the Board of Directors and all the members of the National Water Alliance, I thank you for the opportunity to testify concerning S.904, the "Water Research Foundation Act of 1985."

The United States is facing complex water problems which are difficult to solve, anticipate or even define. As the nation's waters become more unusable, the effects on public health, the economy and the environment become increasingly detrimental. The problems are not created by inadequate resources, but by a mix of social, political, legal, environmental and economic variables. The societal costs associated with the contamination of surface and groundwater, the inadequate planning for future demands, the uncertainty of water rights, and the myriad related institutional conflicts could be greatly reduced through improved planning, additional basic and applied research and information dissemination. Such research has received insufficient support from both federal and state governments.

As a nation we simply do not know what we know and what we don't know about water. We do not have a comprehensive means to plan research and focus interdisciplinary studies on national priorities - or to even set those priorities. We do not have an efficient means to enlist the expertise of the diverse communities which are integral to water resources planning and management. For the most part, we simply react from crisis to crisis on a piece-meal basis.

At its annual meeting on January 23, 1985, the Board of Directors of the National Water Alliance unanimously passed a policy resolution expressing strong support for currently authorized federal water research programs and for current state, and other non-federal, water research efforts.

The National Water Alliance also expressed strong support for additional basic and applied research, research planning and correlated dissemination of water-related information. To effectively accomplish these goals, the National Water Alliance recommended the creation of a National Water Research Council.

In its consideration of this policy resolution, the Board of Directors reviewed the conclusions and recommendations resulting from The National Water Alliance 1984 programs. This review included a legislative summary written by National Water Alliance officers and staff in the form of a draft bill. That draft was made available to Congress and is, I believe, the framework for S.904.

The recommendations of the National Water Alliance Board of Directors were not made lightly or without extensive attention and debate. From September of 1983 through September of 1984, the NWA sponsored four national symposia on the issues of research and information dissemination. These programs paralleled the study conducted by the Chesapeake Research Consortium (CRC) for the Council on Environmental Quality (CEQ). That study was directed by Congress, in

Public Law 98-181, with a deadline of September 1984.

The National Water Alliance also conducted an extensive survey of its membership and other interested persons during this time period. A total of 5,000 questionnaires were distributed and approximately 500 received. The questionnaire was not intended, by any means, to be a scientific sampling, but a means to stimulate thought and discussion on the various facets of the proposed center, from a wide range of individuals and interests.

Both the NWA Symposia and the questionnaire served to make some very strong points concerning the purposes and structure of the Research Planning Center and the Information Clearinghouse as described in PL 98-181.

The survey and symposium conclusions were summarized as follows:

1. There are problems in the way in which we manage and study water resources.
2. Water problems should not be handled exclusively by the individual states.
3. Regarding additional research, multi-disciplinary research is the greatest need and there is an indication of a greater need for more applied research than for more basic research.
4. The center should serve to define research priorities, coordinate existing activities and conduct multi-disciplinary studies.
5. Professional water managers could best benefit from a multi-disciplinary water research facility, with agriculture a close second,

industry third, and other groups such as small business also considered.

6. The center should be capable of long-term research and setting long-term priorities.

7. The two centers should serve as the link between the research efforts of Government agencies and other public and private water research efforts. The centers should maximize currently available research capabilities.

8. The centers should have sufficient funding and resources to set forward-looking priorities and goals.

9. A central clearinghouse would be valuable to all sectors at all levels but would be most valuable to professional water managers.

10. The directors of the centers should be chosen by their peers.

11. There should be permanent "core" staff with most research contracted for, or "farmed out," and experts brought in only on specific projects.

12. The programs should be determined by a Council or Board of Directors.

13. Both centers could be combined as an independent agency.

The NWA symposia were vehicles for discussion and debate. Divergent viewpoints, from both members and non-members of the National Water Alliance, were sought to assure a well-rounded presentation of the various proposals.

It was this thorough consideration which gives strength to the recommendations of the NWA Board of Directors. There may remain, of course, a range of opinions on particular aspects of the bill and Corporate, Organizational, and Individual members of the National Water Alliance are encouraged to present independent comments and recommendations concerning specifics of S.904 to the Committee.

The conclusions of the NWA programs are very similar to those presented by the Chesapeake Research Consortium, and Council on Environmental Quality in the September 28, 1984, report.

In recommending a series of "incremental" options, the report states that "...a major weakness in the existing arrangement is the fact that, at any given time, it is impossible to 1) establish the content and scope of the overall national water research effort, 2) determine its progress over time, or 3) ascertain its future directions. We have observed in this study, as did the National Research Council in 1981, that it is exceedingly difficult to assess the scope and nature of federal water research on an ad hoc basis. The programs involved are complex and diverse. A listing of projects being conducted by individual investigators or agencies provides no useful information on the historical development of research agendas nor the factors that have led to their design. Without such information being available on a continuing basis, any assessment of the national water research effort is bound to be superficial and unproductive. More important, neither the Congress, the Office of Management and Budget (OMB), the general public, nor the agencies themselves have a summary of all the information needed to make such judgments. It is likely that this state of affairs is at least partially responsible for the concern expressed over water research in the Office of Technology Assessment report and by the National Water Alliance."

The CRC/CEQ report presents a series of options which include improving the coherence of existing programs, a center to direct and support extramural research, and an institute to study interdisciplinary water research issues. The options related to the information clearinghouse range from improving existing systems, to a referral center, to a comprehensive clearinghouse system with regional and state centers.

The CRC/CEQ report clearly supports all of the options:

The options proposed are not mutually exclusive. Each research center meets a prescribed need and thus sufficient justification exists for all three to be established simultaneously. Research and information functions could also be combined within a single organizational entity.

Sections 2 and 3 of S.904 Water Research Foundation Act are in purpose and structure very similar to Option #2 as outlined on pages 21 through 27 of the CRC/CEQ report. That option creates an independent National Water Research Center which would be governed by a Board of Directors and administered by a Director and staff. It would be responsible for establishing priorities for research on major water-related issues confronting the nation and be capable of supporting extramural research.

This option is described in the report as being "ideal." The great majority of The National Water Alliance survey respondents believe independence for the centers to be not only "ideal," but absolutely essential if the goals of the program are to be reached.

S.904 also gives the Board of Directors the flexibility to implement, with funding approval by Congress, some of the elements of Option #3. With that option, the authors of the CRC/CEQ report describe a research "institute" which would bring together Federal and Non-federal experts from a variety of disciplines including engineers, economists, social scientists, lawyers, as well as physical scientists for focused studies on interdisciplinary topics. These topics could include non-point source pollution controls, conjunctive uses of surface and groundwater, a model for state programs for groundwater protection, or similar multi-disciplinary topics with a defined scope and national implications.

The institute concept could be organized within the Water Research Planning Center or be developed under a university consortium or other organizational structure. In that case, it could be funded through the Water Research Foundation, with established criteria. The institute would not require new physical facilities and could consist of more than one program or entity. It could be funded in part by the Foundation's operating funds and in part by the extramural grants of the Water Research Foundation, and both centers.

This structure would also lend itself to cost sharing by other entities as would the Research Planning Center. It would also be subject to a "sunset" review every five years, required by Section (6) in the printed bill.

Section (4) of the Act establishes a Water Information Clearinghouse. The structure of the Bill allows flexibility in planning and development on the part of the Director and the Board. It is anticipated that the Clearinghouse would be primarily a referral center initially. More extensive services could be developed by the Board, including site specific information within the states, when specific user groups are defined. Such recommendations would be included in a Budget Justification submitted to Congress.

Our respondents and program participants strongly recommend the utilization of existing capabilities, institutions and organizations for the Clearinghouse as well as for the Research Planning Center.

The authorization level established in Section (7) would appear to be adequate to establish and eventually administer the Foundation, including both centers. Section (7) also includes a $300,000,000 authorization for extramural grants. The extramural grant program is essential to meeting the goals of the act. That level of authorization, 300 million dollars, probably reflects accurately the need for immediate additional support for water research. This is especially true in the face of declining Federal participation in water quality and water supply programs.

In terms of current programs, the best estimate we have is that the Federal Government is spending about $300 million a year on water-related research and the annual expenditures have declined by about 30% over the past few years. This is the general trend on all non-defense research. Federal non-defense research has been decreased from $19 billion annually to $16 billion over the past five years. In the same period, defense-related research has ballooned from 19 billion to $42 billion, per year.

Even if full authorization were to be funded by Congress, the total federal expenditure for water-related research would still only be about 4% of non-defense research and about 1% of Defense research spending.

It is, however, unlikely the full authorization could be obligated in the first few years, but the amount authorized in the bill gives some flexibility to the Board of Directors and to the Congress. It is possible, of course, that a higher level of authorization may be desirable in future years. That could be determined after the "sunset" review process required at the end of the first five year period. Additionally, actual funding is required on an annual basis through the appropriations process and is subject to annual hearings.

Mr. Chairman, the question before the committee is not one of whether we need to intensify our water research efforts in the country, but rather one of how we should do it. It is a question of how can we effectively meet the information requirements demanded by a rapidly changing complex society. It is a question of whether we afford to continue with an insufficient and fragmented research effort.

The National Water Alliance is not a research organization and would not directly participate in the Water Research Foundation programs. However, it has been clear from our first conference in September of 1983, that our ability to make recommendations on national water policy issues is possible only to the extent of available knowledge and information. Although much data is currently available, much knowledge and understanding is not. As a country, we will need even more data because we simply do not have enough information on what is happening either on the surface or under the ground. But the accumulation of data is inadequate to policy-makers without an analysis of changing social, political, institutional and environmental goals and conditions. The Federal agencies have fine research programs and they need to be continued, fully funded, and in many cases expanded. But longer term planning and, a greater part in that planning by the non-federal community, will be crucial.

S.904 is a practical mechanism to provide well considered support directly to programs at the state and local level where more support will be needed if we are to continue to shift responsibility for water research planning and implementation to the states and private sector. It also strengthens federal programs and helps to better coordinate the federal role.

But more importantly, S.904, the Water Research Foundation Act raises water research to the level of importance absolutely necessary in this country. It finally gives recognition to water as being central to our national well being.

We compliment the sponsors of the Bill for their leadership and thank the committee and you Mr. Chairman for the opportunity to testify.

Senator **Durenburger**. Let me say to the last two witnesses that we are going to have to recess until about 3:10 which is about 7 minutes, and I will be right back.

[Short recess.]

Senator **Durenburger**. Gentlemen, thank you very much. C.J. Smith, secretary, the Association of Metropolitan Water Agencies and Ken Miller, chairman, American Water Works Association Research Foundation.

Thank you for being here. Your full statements will be made a part of the record, and we will proceed with Mr. Smith.

TESTIMONY OF C.J. SMITH, SECRETARY, ASSOCIATION OF METROPOLITAN WATER AGENCIES, AND KEN MILLER, CHAIRMAN AMERICAN WATER WORKS ASSOCIATION RESEARCH FOUNDATION

Mr. **Smith**. Thank you, Mr. Chairman, I am C.J. Smith, secretary of the Association of Metropolitan Water Agencies and superintendent of the Bureau of Water in Knoxville, TN. I very much appreciate the opportunity to appear before you today on behalf of our member agencies.

The association was formed in 1981 to serve as a voice for publicly owned water supply agencies in the Nation's larger metropolitan areas. Member agencies of our association are responsible for providing high-quality, safe drinking water to more than 43 million people in 45 large cities.

Mr. Chairman, as the major conveyors of drinking water to the public in this country, we are extremely concerned about the quantity and quality of our Nation's water resources. As the demand for water continues to grow, as it undoubtedly will, it becomes increasingly important to take positive steps to protect and manage this vital resource.

In the past, Congress, States, as well as local officials have, for the most part, reacted to water problems instead of acting to prevent them. At the Federal level, many of our environmental statutes, including the Clean Water Act, Safe Drinking Water Act, as well as the Resources Conservation and Recovery Act and Superfund were enacted largely in response to the pressing problems of surface and groundwater contimination. It is time that we as a nation take the lead in water-related issues rather than reacting to problem situations. We believe that only through a broad-based, comprehensive research effort can we hope to accomplish this goal.

We do not believe that wate research and study should rest solely with the Federal Government. Quite the contrary. AMWA has been working closely with the AMWA Research Foundation and National Association of Water Companies to develop a voluntary reseach assessment program funded by water utilities through their rate structure to ensure both scientific and technological advancements keep pace with the needs of the public and the drinking water supply community.

This effort, which is gaining wide support among both public and private water supplies, would address drinking water issues ranging from the implications of water treatment chemicals on water quality, protection and management of surface and ground water to water distribution, infractructure, modernization, and system planning and financing.

We have some concern that the research foundation proposed in S. 904 would duplicate or be perceived as duplicating the efforts of the water utility community. At a time when budget constraints mandate that we spend wisely, we need to coordinate our efforts to cover as broad a spectrum of water resource-related issues as possible. Duplication of efforts simply wastes time and valuable resources and slows progress on other important water resoource issues.

Mr. Chairman, we believe that the foundation and the grant program provided for in S. 904 are intended to facilitate and not duplicate efforts such as the water supply community initiative. We appreciate the fact that S. 904 recognizes the importance of non-governmental research programs and pledges to encourage and work in cooperative with such efforts.

However, in order to promote the understanding that the proposed Research Foundation is not intended to duplicate ongoing or new efforts in the water research area, we recommend that the name of the Foundation be changed to the National Water Resources Research Planning Center and the grant program be set up to match funds generated by non-Federal research organizations.

AMWA would be very happy to work with this subcommittee or your staff to work out legislative language along these lines.

AMWA commends this subcommittee for its interest and efforts in water research. We support the creation of the Water Research Foundation proposed in S. 904 with some modification. We believe that S. 904 would provide the framework for coordination and implementation of a comprehensive research planning program to address the multitude of complex issues which affect water resources in this country. We also support the creation of a water information clearinghouse to foster the exchange of information on all areas of water research.

Mr. Chairman, water resource problems have increased in both scope and complexity over the past several years. At the same time, Federal funding of water-related study has declined significantly. The grant program contained in S. 904 is greatly needed, not only to support existing research activities, but to facilitate new efforts such as the water utility research program. These funds could well provide the impetus for gaining additional financial support from all sectors of society and develop a true partnership, not only among the various levels of government, but the private sector, as well.

There is another aspect of water resource research which needs to be discussed, and that is the need for an entity like the proposed research foundation to focus on the larger picture; to coordinate planning and research for all aspects of water use, and to identify and support areas where research is now lacking.

The social, economic and technological changes taking place in this country mandate that we act to effectively manage our Nation's water resources. We need to begin to identify the water resource needs of today and to plan for the future. If we are to grow and prosper, we need answers to some of the basic but serious questions: For example, what impact will population shifts have on the water resources of a given region?

In conclusion, Mr. Chairman, we believe the research foundation proposed in S. 904 could very well be the organization needed to put all the pieces of the puzzle together by promoting and supporting research efforts on specific water problems and by focusing on the broader picture of where we are headed and where we need to be in the water resource area. Thank you very much.

Senator DURENBERGER. Thank you very much.

Mr. Miller?

Mr. MILLER. Thank you for the opportunity to testify on this bill, Mr. Chairman. I am Ken Miller, the current chairman of the board of trustees for the American Water Works Association Research Foundation. I have submitted my formal written statement for your review and will only highlight what I consider to be the five key points of that statement.

It is the water industry's opinion that the general thrust of the bill is an admirable one and one that will resolve many of the planning and policy problems that currently exist within the water resources arena. There is a definite need for the interdisciplinary and interregional studies proposed for this new water research foundation, and the industry welcomes another funding source in this neglected area.

An excellent example of this interdisciplinary need is in the arena of wastewater reuse as a future water supply resource; the lack of clear mandate for a study on the problem the Federal level has prevented the Government from being an active researcher in this field. Because of this the Denver Water Board has invested more than $30 million of its own money to investigate the resource potential of reuse to solve its future water needs. Even though the reuse research will help solve Denver's problems, its applicability nationwide and even worldwide is much greater than the local benefit.

This is a situation where Denver's research investment, which most water systems would not be unable to afford, is benefitting the industry even more than it is benefitting the city. The proposed Water Research Foundation would help to focus that type of effort and talent into a logical and effective research framework.

One of the concerns that we have with the bill as it is now written relates to the water industry's attempt to internally and voluntarily establish a comprehensive research program through a self-supporting internal assessment effort. That internal effort is now at a delicate and sensitive stage and we are concerned that as the bill is currently written, the proposed foundation as it is currently defined by the bill would stymie or delay any further commitment by the utilities to a self-supportive system of research funding. There may be some within the industry who would use the proposed authorization as justification for letting the Federal Government fund the research for the industry rather than committing themselves to an industry supported effort.

In our statement, we have outlined two ways to avoid this possibility: First, a concurrent resolution adopted by Congress would send a clear signal to the water utilities that an internal assessment program is of national interest and concern. Second, a provision could be added to the bill offering matching funds as a means of stimulating industry involvement.

This second provision would also key into another basic premise of Senate bill 904; that is the enhancement of existing research efforts within the industry and the prevention of any duplication of effort. As you know, the AWWA Research Foundation has made tremendous strides in the past few years in this area, and we look forward to the establishment of a research partnership with the proposed organizations.

To summarize our position, we commend the general purpose of the bill and pledge our cooperation. We ask that the water industry initiatives and our assessment effort be recognized and enhanced by congressional action—specifically a concurrent resolution—and by the proposed water research foundation through a matching funding provision that any duplicative programs or institutions be precluded.

Thank you very much, Mr. Chairman.

Senator **Durenberger**. Thank you both very much, and thank you for the thoroughness of your statement.

Let me see if I can get some idea from each of you that is a little more specific than your full statements about water resource research needs. We haven't gotten too specific on it. We have talked mainly about process and organization, and so forth. Could each of you react from your special perspectives about the current areas of inadequacy in the research area, where you think there ought to be research. Mr. Miller, you have made an interesting point, that we run the risk by having the research moneys coming from a governmental source but of not having, I think, you phased it was, a specific kind of——

Mr. **Miller**. Voluntary assessment of the industry?

Senator **Durenberger**. Yes, and that there is a certain value to that, I take it, that you might want to address in your response to my question.

Mr. **Miller**. Let me respond to that if I could, C.J.

Mr. **Smith**. Fine.

Mr. **Miller**. The electric industry is currently funding about $350 million worth of research a year through a small assessment on electrical utility rates. The gas industry operates a similar assessment program and funds about $170 million of research a year. The water industry's centralized research effort through AWWA has grown from $75,000 in funding in 1980 to $500,000 in 1983 to over $2 million this year. We hope to increase our funding level to over $3 million in 1986, again with the help of a million-dollar grant from the Federal Government which we have received for the past 2 years.

Our research effort is at a sensitive stage of development in that we are working to convince water utilities to place a voluntarily assessment on their water rates based upon volume of sales. We currently have pledges in excess of a half a million dollars with a goal of $1 million by the end of this year.

We believe that S. 904 could be compatible with the water utility industry's voluntary assessment effort. Money raised through such an assessment could be matched with funding authorized by S. 904.

Our concern is that S. 904 might provide an inducement for utilities to continue to rely on Federal research funding instead of implementing its own voluntary assessment.

Senator DURENBERGER. The point is not that there are certain kinds of research that the utilities will do with the right kind of financial base, but might not be done in other sectors; it was simply that you would like to see the water utility doing what gas and electric utilities are doing by way of making research contributions.

Mr. MILLER. We are concerned with providing for more research directed toward the operational problems of water utilities.

Dr. Mills noted in his testimony that $300 million is spent on water research. But it is directed toward a number of federally mandated priorities. It is very fragmented in this country. Funds for drinking water research came almost exclusively from EPA. But they are spent on regulatory and health research. They are not directed towards the research needs of water utilities.

Senator DURENBERGER. Mr. Smith, do you want to reply?

Mr. SMITH. Yes, sir. I certainly agree with Mr. Miller. We want to manage the research for that segment of the national water problem that relates to drinking water and the treatment of drinking water. There are many, many other problems, but the one that has been highlighted through EPA is treatment and water quality standards.

The water utilities are joining together and working very hard to fund the research foundation and to enhance its presence on the horizon of research. We would certainly like for this bill or any other bill to match these funds.

I happen to work for a utility that is a power gas and water utility. My fear is the other divisions contribute significantly to research and water contributes very little. We certainly would like to head in that direction.

Senator DURENBERGER. Gentlemen, thank you very much for your testimony. I appreciate it a lot and that of all the other witnesses.

[The prepared statements of Messrs. Smith and Miller follow:]

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MEMBER AGENCIES

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Norfolk Department of Utilities, VA
Seattle Water Department, WA

Statement of C. J. Smith

Secretary

Association of Metropolitan Water Agencies

on the

Water Research Foundation Act of 1985

(S. 904)

before the

Senate Subcommittee on Intergovernmental Relations

June 20, 1985

Mr. Chairman and Members of the Subcommittee, I am C. J. Smith, Secretary of the Association of Metropolitan Water Agencies and Superintendent of the Bureau of Water for Knoxville, Tennessee. I very much appreciate the opportunity to appear before you today on behalf of our member agencies.

The Association of Metropolitan Water Agencies was formed in June 1981 to serve as a voice for publicly-owned water supply agencies in the Nation's larger metropolitan areas. Member agencies of our Association are responsible for providing high quality, safe drinking water to more than 43 million people in 45 cities.

Mr. Chairman, as the major conveyors of drinking water to the public in this country, we are extremely concerned about the quality and quantity of our nation's water resources. As the demand for water continues to grow, as it undoubtedly will, it becomes increasingly important to take positive steps to protect and effectively manage this vital resource.

In the past, Congress, states as well as local officials have, for the most part, reacted to water problems instead of acting to prevent them. At the federal level many of our environmental statutes, including the Clean Water Act, Safe Drinking Water Act as well as the Resource Conservation and Recovery Act and Superfund were enacted largely in response to the pressing problem of surface and groundwater contamination. It is time that we as a nation take the lead on water-related issues rather than reacting to problem situations. We believe that only through a broad-based comprehensive research effort can be hope to accomplish this goal.

Water Utility Efforts

We do not believe that water research and study should rest solely with the federal government. Quite the contrary. AMWA has been working closely with the AWWA Research Foundation and National Association of Water Companies to develop a voluntary research assessment program funded by water utilities through their rate structure to ensure both scientific and technological advancements keep pace with the needs of the public and the drinking water supply community.

This effort, which is gaining wide support among both public and private water suppliers, would address drinking water issues ranging from the implications of water treatment chemicals on water quality, protection and management of surface and groundwater to water distribution infrastructure modernization and system planning and financing.

We have some concern that the Research Foundation proposed in S. 904 would duplicate, or be perceived as duplicating, the efforts of the water utility community. At a time when budget constraints mandate that we spend wisely, we need to coordinate our efforts to cover as broad a spectrum of water resource related issues as possible. Duplication of efforts simply wastes time and valuable resources and slows progress on other important water resource issues.

Mr. Chairman, we believe that the Foundation and the grant program provided for in S. 904 are intended to facilitate and not duplicate efforts such as the water supply community initiative. We appreciate the fact that S. 904 recognizes the importance of non-governmental research programs and pledges to encourage and work in cooperation with such efforts. However, in order to promote the understanding that the proposed Research Foundation is not intended to duplicate ongoing or new efforts in the water research area, we recommend that (1) the name of the Foundation be changed to the National Water Resources Research Planning Center and (2) the grant program be set up to match funds generated by non-federal research organizations.

AMWA would be very happy to work with members of this Subcommittee or your staff to work out legislative language which would clarify the scope and purpose of the proposed Research Foundation.

The Merits of S. 904

AMWA commends this Subcommittee for its interest and efforts in the water research area. AMWA supports the creation of the Water Research Foundation proposed in S. 904 albeit with some modification. We believe S. 904 would provide the framework for coordination and implementation of a comprehensive research planning program to address the multitude of complex issues which affect water resources in this country. We also support the creation of a water information clearinghouse to foster the exchange of information on all areas of water research.

Mr. Chairman, water resource problems have increased in both scope and complexity over the past several years. At the same time, federal funding of water-related study has declined significantly. The grant program contained in S. 904 is greatly needed not only to support existing research activities but to facilitate new efforts such as the water utility research program.

These funds could well provide the impetus for gaining additional financial support from all sectors of society and develop a true partnership not only among the various levels of government but the private sector as well.

There is another aspect of water resource research which needs to be discussed and that is the need for an entity like the proposed Research Foundation to focus on the larger picture; to coordinate planning and research for all aspects of water use and to identify and support areas where research is now lacking. The social, economic and technological changes taking place in this country mandate that we act to effectively manage our nation's water resources. We need to begin to identify the water resource needs of today and to plan for the future. If we are to grow and prosper we need answers to some very basic but serious questions. For example, what impact will population shifts have on the water resources of a given region? How do we ensure access to our nation's trading centers through harbors and waterways? Who benefits and who pays for modernization of our deteriorating infrastructure facilities? How do we deal with problems of drought and flooding? The list of questions which need answers is unlimited; the answers we have are not.

In conclusion, Mr. Chairman, we believe the Research Foundation proposed in S. 904 could very well be the organization needed to put all the pieces of the puzzle together by promoting and supporting research efforts on specific water problems and by focusing on the broader picture of where we are headed and where we need to be in the water resource area.

Mr. Chairman this concludes my remarks. I would be happy to answer any questions you or members of the Subcommittee may have.

STATEMENT

OF THE

AMERICAN WATER WORKS ASSOCIATION RESEARCH FOUNDATION

6666 WEST QUINCY AVENUE

DENVER, COLORADO 80235

PRESENTED BY
Mr. Kenneth J. Miller
Chairman, Board of Trustees
AWWA Research Foundation

and

Vice President
CH2M Hill Consulting Engineers
Denver, Colorado

CONCERNING

Senate Bill 904, "Water Research Foundation Act of 1985" and its potential impact upon the Nation's water supply systems and the water industry's own water research effort.

Before the

SENATE SUBCOMMITTEE ON INTERGOVERNMENTAL RELATIONS

June 20, 1985

Mr. Chairman, I am Kenneth J. Miller, Vice President of CH2M Hill Consulting Engineers and current Chairman of the Board of Trustees of the American Water Works Association Research Foundation (AWWARF). I am also a past president of the American Water Works Association and active on numerous federal level task forces and advisory groups. The AWWARF was created by the water utilities of North America to serve as the industry's center for applied research and development. More than 3300 water utilities and related organizations are dues-paying members of the AWWARF. Most of the drinking water produced in this nation--about 80% of it--comes from our membership. The AWWARF was established about eighteen years ago and in recent years we have undertaken a major program of expansion. We think of ourselves as in the second phase of a four phase effort, heading toward a truly substantial, self-supported industry program of research and technology transfer. At present we have approximately 50 research projects underway. In addition, we operate a computerized data base of otherwise unpublished utility research and we publish a monthly newsletter, a bi-monthly, and a quarterly. All these activities are governed by a Board of Trustees that mixes utility managers with technical or scientific experts and that is extensively linked to local and regional entities throughout the country.

We are pleased to have the opportunity to come before this hearing panel because the AWWARF and its members have an obvious interest in water resources research. We are concerned about the quantity and quality of the resources available to the nation's water suppliers. We are interested in the protection and preservation of those resources for drinking water purposes. And for these reasons, we welcome and applaud the interest of the Congress in this topic.

I will limit our specific remarks to the Water Research Planning Center portion of the bill since I am quite sure that the panel and subcommittee staff are well aware of the information services that are currently operating within the water supply industry. Systems such as AWWA's WATERNET, WATERQUEST AND AQUALINE are functioning quite well and seem to be satisfying the needs of the drinking water profession. I am hopeful that the system created under this bill will enhance, but not duplicate, those successful systems.

We in the water industry, preferred the original proposed name for the center-National Water Resources Research Center-because we feel that it more accurately depicts its mission and function. The current name-Water Research Foundation-might create confusion with existing organizations, such as the AWWA Research Foundation, the Drinking Water Research Foundation, the Water Research Center, Water Research Institute, etc. One minor comment is that we feel that at least one member of the Board of Directors should be a representative of the drinking water industry as an end user of this Nation's water resources. There is no other use of our water resources more sensitive or important than drinking water and thus the industry should have a voice in directing this proposed program.

We believe that the general thrust of the bill is admirable but the inclusion of some specific conditions would make it even more useful now and in the future. For instance, there are problems in the way in which we manage and study water resources and these problems cannot be handled exclusively by the individual states. The proposed Center would help guide the states toward a policy and planning consensus. We certainly agree with the concept that the Planning Center must be an independent agency and not under the control of any existing agency or department. It is only through independent action that the new Center will be able to creatively affect the water resources policies that have been installed in the past.

Additional research is always needed and the water industry welcomes another funding source into an area that has been neglected. We believe that the new Center should work within the framework of existing organizational missions where possible (there is an expansion of this point later) but there is a definite need for interdisciplinary and inter-regional studies that are not currently being addressed. Perhaps one good example of this is the basic and applied research necessary in the area of wastewater reuse. Essentially, nothing is being done at the federal level in this critical area of future water resources development. Since the demise of OWRT there has been no funding for process or institutional research and there has never been any federal sponsorship of the necessary health effects studies. To fill this information gap, the Denver Water Board alone has invested over $30 million to study reuse as a means of resolving its future water resources problems.

We all agree that the Center will assist in the correlation of the efforts of all federal, nonfederal and private research programs dealing with water issues. This is something that is obviously needed within the water community and will go a long way toward eliminating wasteful duplication. However, we have one potential concern with the establishment of this Center which I would like to mention.

The drinking water industry is in the midst of internally expanding its own research effort through AWWARF by the development and implementation of an assessment program tied to water rates. We feel that it is an equitable system where the beneficiaries of the research pay its costs. It is patterned after the extremely successful electrical and gas research programs in this country and several foreign drinking water research programs. As logical as this may seem, it has taken the leadership of our industry a great deal of time to convince the membership to at least try the assessment program. It was, and still is, a difficult struggle because the industry is accustomed to having the research done by others; they were able to sit back and let the Public Health Service, EPA, and OWRF fund the research. For those of us advocating the development of an equal research partnership for the industry;, the timing of this bill is of some concern. There are those within our industry who will see the proposed authorization of this bill and say "we don't have to do anything, the feds are going to do it for us." I believe that this is something that no one wants--not the Committee and not us. However, I have a proposed solution within the framework of the bill for your consideration.

We are delighted that one of the stated purposes of the proposed Foundation is to "encourage the establishment of nongovernment water research programs by water utilities and others and work in cooperation with such efforts to further promote research on water issues." Using this statement as a springboard there are two ways that the Congress can encourage and enhance the industry's research and assessment program as well as eliminate the potential "let the feds do it" attitude. The first is that Congress could adopt a concurrent resolution supporting the industry's internal attempt to establish a comprehensive research program. Although short of law, a concurrent resolution would send a clear message to the water utilities that such an effort is of national interest and concern. Secondly, a provision could be added to this bill which calls for the proposed Water Research Foundation to match any funding that is internally generated by the water supply industry through the assessment program. Obviously, this provision would serve to encourage participation in the assessment program by promising to double the industry's investment.

In his introduction of S. 904, Senator DeConcini stated "The independent Foundation will not duplicate Federal agency, or other research efforts----." We are happy that the existence and integrity of other research efforts has been recognized. While I can't speak for the other areas of water research, I can say that the current research programs in drinking water provide extensive coverage of the topic and practically any direct involvement by this new Center would be considered duplicative to some extent. That is not to say that all possible research on the subject of drinking water is being done but that the mission/responsibilities of the various drinking water organizations cover the field fairly well.

For instance, the AWWARF is well established in our corner of the drinking water research arena and our program is well defined by the practical interests of municipal water utilities. EPA has a complementary research effort underway dealing with the health effects of contaminants and the regulatory aspects of drinking water. Additionally, there are thousands of water utilities conducting developmental research aimed at specific problems within their water systems.

One area of obvious need is basic research of long-term importance to the industry and public. Because of its mission the AWWARF applies only 5 to 15 percent of its budget to long-range efforts. EPA, by necessity, concentrates its efforts at current regulatory problems with emphasis on health effects research.

Along these same lines of nonduplicative effort, all of the water utility managers testifying at The Council on Environmental Quality hearings during the summer of 1984 indicated that there was no need to create another research institution in drinking water. Obviously, they felt, and still feel, that their needs are adequately served by existing research organizations.

The AWWARF's experience and our study of other water research programs here and abroad, tell us that working with existing institutions is generally the most productive approach. The key to a successful, effective research institution is that it must have the trust and confidence of its clients.

It must be perceived as being responsive to the real-world problems and needs of its clients and, indeed, its research program must be conceived and managed by and for its clients. Statistics show that three out of four new products or developments originate because of a user need: in other words they are created out of necessity. It follows that a research organization must be close to its clients to recognize those needs. On the other hand, new institutions lack the necessary constituency; and their view of needs and priorities often conflicts with those of the would be constituents.

To summarize our position, we commend the general purpose of the bill and pledge our cooperation. We ask that the water industry initiatives in research and research funding be recognized and supported by the Congress and by the proposed Foundation, and that any duplicative programs or institutions be precluded. I think you, Mr. Chairman, for this opportunity to appear before you. If you or any other Member have any question, I would be pleased to respond.

Senator **Durenberger**. The hearing is adjourned.

[Whereupon, at 3:35 p.m., the subcommittee was recessed, subject to the call of the Chair.]

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

99TH CONGRESS
1ST SESSION

S. 904

To establish a Water Research Foundation, to include a Water Research Planning Center and a Water Information Clearinghouse, to promote water research and to disseminate information relating to water resources.

IN THE SENATE OF THE UNITED STATES

APRIL 15, 1985

Mr. DECONCINI (for himself, Mr. DURENBERGER, Mr. MOYNIHAN, Mr. HEINZ, Mr. MATSUNAGA, and Mr. ABDNOR) introduced the following bill; which was read twice and referred to the Committee on Governmental Affairs

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A BILL

To establish a Water Research Foundation, to include a Water Research Planning Center and a Water Information Clearinghouse, to promote water research and to disseminate information relating to water resources.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Water Research Foundation Act of 1985".

ESTABLISHMENT OF WATER RESEARCH FOUNDATION

SEC. 2. (a) ESTABLISHMENT.—There is established in the executive branch of the Government the Water Research

Foundation (hereinafter in this Act referred to as the "Foundation"). The Foundation shall include a Water Research Planning Center (as established in section 3) and a Water Information Clearinghouse (as established in section 4).

(b) PURPOSES.—The Foundation is authorized and directed to—

(1) promote and support water research and related study activities within the States and territories of the United States;

(2) survey and link and supplement as required the appropriate existing water research and information dissemination efforts and capabilities within the States;

(3) determine and make public, recommendations of additional water resources study needs;

(4) assist in the determination of the long term national priorities for the study of basic and applied studies related to scientific, social, and legal concerns linked to the preservation, protection, and use of the Nation's water resources;

(5) support scientific and social research by making contracts or other arrangements including grants for the conduct of such study and to appraise the impact of such studies;

(6) foster the interchange of water resource information within the United States and between the United States and foreign countries; and

(7) encourage the establishment of non-governmental water research programs by water utilities and others and work in cooperation with such efforts to further promote research on water issues.

(c) ORGANIZATION.—(1) The Foundation will be governed by a Board of Directors (hereinafter in this Act referred to as the "Board"), which shall be composed of eleven members to be appointed by the President, with the advice and consent of the Senate. The Board shall exercise the authority granted to the Foundation by this Act.

(2) The persons nominated for appointment as members shall be—

(A) eminent in the fields of education, engineering, environmental study, hydrology, water management, agriculture, basic and applied sciences, computer technology, finance, public policy, and other fields which impact water-related issues;

(B) selected on a nonpartisan basis solely on the basis of established records of distinguished service; and

(C) selected in a manner that provides representation of the views of water leaders in all areas of the United States.

(3) The President is requested, in making the nominations of persons for apppointment as members, to give due consideration to any recommendations for nomination which may be submitted to him by organizations representing, or engaged in, fields of endeavor referred to in paragraph (2).

(4) The term of office of each voting member of the Board shall be four years except that—

(A) any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term; and

(B) the terms of office of the members first taking office after the date of the enactment of this Act shall expire as designated by the President at the time of appointment, five at the end of two years, and six at the end of four years, after the date of enactment of this Act.

Any person who has been a member of the Board for four consecutive years shall thereafter be ineligible for appointment during the two-year period following the expiration of the fourth year.

(5) The President shall call the first meeting of the Board, at which the first order of business shall be the election of a Chairperson. The Board shall meet no less than twice during each calendar year. Six members of the Board shall constitute a quorum.

(6) Members of the Board shall serve without pay, except that they shall receive per diem and travel expenses in accordance with section 5703 of title 5, United States Code.

(7) Within one year of its appointment, the Board shall—

(1) hire a director for the Water Research Planning Center and a director for the Water Information Clearinghouse;

(2) determine the location, type of facilities, and other logistical requirements for the Center and the Clearinghouse; and

(3) determine programs and submit a budget request and justification to the Congress for fiscal year 1986.

(d) GENERAL AUTHORITY.—(1) In order to carry out the provisions of this Act, the Board shall have the authority to—

(A) prescribe such rules and regulations as it deems necessary governing the manner of its operations and its organization and personnel;

(B) make such expenditures as may be necessary for administering the provisions of this Act;

(C) enter into contracts or other arrangements with organizations or individuals in the United States and foreign countries, including other government agencies of the United States and of foreign countries, for study and dissemination activities as the Board deems necessary to carry out the purposes of this Act;

(D) acquire by purchase, lease, loan or gift, and to hold and dispose of by sale, lease, or loan, real and personal property of all kinds necessary for, or resulting from, the exercise of authority granted by this Act;

(E) receive and use funds donated by others, if such funds are donated without restriction other than that they be used in furtherance of one or more of the general purposes of the Council;

(F) publish or arrange for the publication of appropriate information so as to further the full dissemination of such information;

(G) accept and utilize the services of voluntary and uncompensated personnel and to provide transportation and subsistence as authorized by section 5703 of title 5, United States Code, for persons serving without compensation; and

(H) prescribe, with the approval of the Comptroller General of the United States, the extent to which vouchers for funds expended under contracts for water resource research and information dissemination shall be subject to itemization or substantiation prior to payment, without regard to the limitations of other laws relating to the expenditure and accounting of public funds.

(2) In the administration of this Act, no department, agency, officer, or employee of the United States shall exercise any direction, supervision, or control over the policy determinations, personnel, or curriculum, or the administration or operation of any State, local, or private school, agency, institution, organization, or association.

WATER RESEARCH PLANNING CENTER

SEC. 3. (a) ESTABLISHMENT.—There is established within the Water Research Foundation, a Water Research Planning Center (hereinafter in this Act referred to as the "Center").

(b) PURPOSES.—(1) The Center is authorized and directed to—

(A) support a broad range of studies in cooperation with other institutions, universities, and Federal and non-Federal agencies;

(B) correlate and link, as appropriate, Federal, State, academic, private sector, and other water related studies;

(C) determine additional research needs and make recommendations to the Congress and the President and to others;

(D) identify and recommend on a continuous basis long term research priorities to include those interrelated scientific, social, and legal concerns which affect water resources management and planning; and

(E) provide funding and other support for basic and applied research and related study efforts as approved by the Board, with emphasis on inter-disciplinary and interregional research for the enhancement of water quality, water quantity and supply, and the natural environment.

(2) The Center shall coordinate its activities with existing research efforts, both public and private, and the Clearinghouse in order to avoid the wasteful duplication of research and related study efforts. The Center may contract for required expertise and other capabilities with approval from the Board.

(c) DIRECTOR.—(1) The Center shall have a director who shall be appointed by the Board and shall be paid at a rate not to exceed the rate of basic pay payable to level V of the Executive Schedule.

(2) The Center may appoint and fix the pay of such additional personnel as the Center considers appropriate.

(3) The director and staff of the Center may be appointed without regard to the provisions of title 5, United States Code, governing appointments in the competitive service and may be made without regard to the provisions of chapter 51 and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates. Any Federal employee subject to the civil service laws and regulations who may be employed by the Center shall retain civil service status without interruption or loss of status or privilege. In no event shall any employee of the Center other than the director receive as compensation an amount in excess of the maximum rate of basic pay payable for GS–18 of the General Schedule.

(4) Subject to the limitations of the following sentence and in accordance with the policies established by the Board, the director shall be responsible for implementing the purposes of the Center described in subsection (b), together with the performance of such other duties as may be delegated to him by the Board. No final action shall be taken by the director in the exercise of his authority under this Act unless the Board has reviewed and approved the proposed action.

(5) The director, with the advice of the Board, is authorized to establish and carry out a program of grants-in-aid to groups or, in appropriate cases, to individuals engaged in or concerned with water research and related studies for the purpose of enabling them ~~to~~ support the purposes of the Board described in subsection (b).

WATER INFORMATION CLEARINGHOUSE

SEC. 4. (a) ESTABLISHMENT.—There is established within the Water Research Foundation, a Water Information Clearinghouse (hereinafter referred to in this Act as the "Clearinghouse").

(b) PURPOSES.— (1) The Clearinghouse is authorized and directed to—

(A) identify and provide information in a timely manner to various user groups including academic institutions, engineers, scientists, business people, State government officials, Federal Government officials, public interest groups, members of the public media, trade associations, and other interested parties;

(B) analyze and synthesize water resource information from a large range of sources and provide references to additional sources of information;

(C) develop an information retrieval system to direct staff and clients to appropriate sources of information on water resources;

(D) evaluate the need, and establish as necessary, a system of regional and State organizations to serve as an integrated clearinghouse system; and

(E) carry out all other functions the Board deems appropriate to enhance its goal of providing a useful and continuous system for the dissemination of information on water-related topics.

(2) The Clearinghouse may support programs with educational purposes ranging from in-depth scholarly symposia, to activities for the employment and identification of individuals of all age groups who are interested in learning about water. These educational programs shall include information presentations at conferences and seminars, the development of publications on various water resource topics, and the development of other information to be made available to the general public.

(3) The Clearinghouse shall, from time to time, reevaluate the adequacy of its national information systems and make improvements as may be appropriate.

(c) DIRECTOR.—(1) The Clearinghouse shall have a director who shall be appointed by the Board and shall be paid at a rate not to exceed the rate of basic pay payable to level V of the Executive Schedule.

(2) The Clearinghouse may appoint and fix the pay of such additional personnel as the Clearinghouse considers appropriate.

(3) The director and staff of the Clearinghouse may be appointed without regard to the provisions of title 5, United States Code, governing appointments in the competitive service and may be made without regard to the provisions of chapter 51 and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates. Any Federal employee subject to the civil service laws and regulations who may be employed by the Clearinghouse shall retain civil service status without interruption or loss of status or privilege. In no event shall any employee of the Clearinghouse other than the director receive as compensation an amount in excess of the maximum rate of basic pay payable for GS-18 of the General Schedule.

(4) Subject to the limitations provided in the following sentence and in accordance with the policies established by the Board, the director shall be responsible for implementing the purposes of the Clearinghouse described in subsection (b), together with the performance of such other duties as may be delegated to him by the Board. No final action shall be taken by the director in the exercise of his authority under this Act unless the Board has reviewed and approved the proposed action.

(5) The director, with the advice of the Board, is authorized to establish and carry out a program of grants-in-aid to groups or, in appropriate cases, to individuals engaged in or concerned with water research and related studies for the purpose of enabling them to support the purposes of the Clearinghouse described in subsection (b).

REPORT

SEC. 6. Five years after the appointment of the Board, the Foundation shall report to Congress concerning—

(1) the activities and programs conducted by the Foundation in the first five years;

(2) the expenditures made by the Foundation during such period with an analysis of the impact of such expenditures; and

(3) whether the Congress should continue or terminate the Foundation with a justification for such continuation or termination.

AUTHORIZATION OF APPROPRIATIONS

SEC. 7. (a) GENERAL AUTHORIZATION.—There are hereby authorized to be appropriated—

(1) $2,000,000 for the fiscal year 1986 for the establishment of the Water Research Foundation, the Water Research Planning Center, and the Water Information Clearinghouse;

(2) $10,000,000 for each of the fiscal years 1987, 1988, 1989, and 1990 for operation of the Water Re-

search Foundation, the Water Research Planning Center, and the Water Information Clearinghouse; and

(3) $300,000,000 for each of the fiscal years 1987, 1988, 1989, and 1990 for scientific and social research grants to carry out the purposes of this Act.

(b) PRIVATE DONATIONS.—In addition to the support provided by Federal appropriations, the Council may receive private donated funds to expand and enrich its programs. A report detailing the amount and sources of all donated funds shall be submitted to the Office of Management and Budget on an annual basis.

(c) OTHER FEDERAL AGENCIES.—The Council may receive federal grants and contracts from federal agencies and departments for special projects which can be conducted through the Center because of its ability to respond to specific water-related study on information dissemination needs.

Texas Tech University
Texas Tech University Health Sciences Center
Office of the President

I am Lauro F. Cavazos, President of Texas Tech University, a major multipurpose state university located in Lubbock, Texas which serves approximately 24,000 students. Texas Tech University recognizes fully the importance to the region and nation of maintaining an abundant supply of high quality water. To this end, Texas Tech University established a Water Resources Center in 1965. Through the center and other entities, we maintain strong and progressive academic and research programs in water resources.

Senate Bill 904 of the 99th Congress, 1st Session, the purpose of which is "to establish a Water Research Foundation, to include a Water Research Planning Center and a Water Information Clearinghouse, to promote water research and to disseminate information relating to water resources" is a particularly well designed document setting forth a realistic solution to one of the most critical problems facing mankind.

With growing population and enhanced technology the water problems of the nation and the world become increasingly complex. They require the attention of well trained and well equipped professionals. Senate Bill 904 addresses this need realistically in establishing a Water Research Planning Center authorized and directed to support a broad range of cooperative studies. The benefits of such a program in works constructed and water practices modified are evident.

Texas Tech and other universities serving the High Plains area have cooperated for many years in the conduct of research with federal, state, and local agencies in striving to optimize the use of groundwater from the Ogallala aquifer. As a result of this research, the water "needs" of agriculture have been reduced

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through genetic modification in the crops, by developing instrumentation for determining the amount and timing of water applications, through changes in cultivation practices, and with the introduction of water delivery methods that minimize losses due to evaporation and unproductive seepage. Additional water supplies have been made available through the reuse of wastewater, artificial recharge, and the secondary recovery of groundwater. Water quality problems have been addressed effectively.

As a very important secondary benefit, these research programs have involved much student participation. The textbook and laboratory cease to be tolerated drudgeries when one is attempting to devise a means to make some field measurement or accomplish some other desired end.

In addition, the requested appropriation for S. 904 would provide sufficient funds to research solutions to problems of significant regional importance. With slight modification of the bill, provision could be made to supplement existing meager research programs at the federal level so regional water resources problems could be addressed more adequately. Finding solutions to regional water problems is, and will continue to be, in the best interest of the nation.

Because of the haphazard status of much research funding, however, water research programs at present are less effective than they could and should be. Normally, the time allotted to a funded research project is short. A program is devised, the participants resharpen some skills which may have been neglected for several years while they worked on other aspects of the broad spectrum of hydraulic-environmental problems, the project is carried out, and a report is written. Many possibly valuable ramifications are filed in the back of the mind for future investigation---and remain there when the researcher retools for the next project. The availability of adequate funds would tend to encourage researchers to prepare proposals for investigations of the more promising of these ramifications, and to bring to bear on their studies the pertinent background of the project which generated them.

The provision in the bill for an Information Clearinghouse is most appropriate. While intensive searches of the literature will continue to be valuable components of research, much of an investigator's time can be saved if bibliographic references and copies of appropriate publications are easily available. At present, no adequate bibliographical aids such as exist in chemistry, petroleum, and other fields are being published for water resources.

The vital importance of water research can be expected to intensify throughout the world as an increasing population strives for improved living conditions. Inevitably, the American universities will be depended upon for the education of a substantial portion of the water researchers of the future---both domestic and foreign. It is in the nation's self-interest that we train the researchers, engineers and scientists who must provide the water supply---made adequate by continuing developments in conservation and renovation---to assure agricultural, industrial, domestic, and recreational supplies. The alternative is growing insecurity and poverty and their accompanying threats to the peace of the world.

Senate Bill 904 is ideally designed to fulfill this need.

Submitted by:

Lauro F. Cavazos

Lauro F. Cavazos, Ph.D.

THE UNIVERSITY OF GEORGIA
ATHENS
30602

OFFICE OF THE PRESIDENT

June 14, 1985

Senator David Durenberger, Chairman
Subcommittee on Intergovernmental Relations
Committee on Governmental Affairs
United States Senate
SH 432 Hart Senate Office Buidling
Washington, DC 20510

Gentlemen:

This statement is submitted for your consideration by The University of Georgia in support of adequate Federal funding of water resources research and education, especially as proposed through the provisions of S.904. This bill, the "Water Research Foundation Act of 1985," establishes for the first time in the Nation's history, a mechanism whereby water resources research may be conducted and the results made available to all of those who deal with our Nation's water resources.

I represent a major research university that contains a cadre of faculty from many disciplines whose specialty is research in water resources -- biology, chemistry, engineering, law, economics and other disciplines that address both technical and social issues that improve or affect how we manage and operate our Nation's water resources. Senate bill S.904 establishes a water research planning center and a water information clearinghouse that promises to focus the attention of the Nation's scientists on that broad range of issues affecting water resources development, conservation and management.

This bill does not focus attention on universities as the only source of research. However, we believe it provides sufficient opportunity for those universities with expertise and imagination to offer, so that long term training and education of water resource professionals as well as research and public service in water resources can be efficiently conducted. The exciting aspect of this bill is that it provides an opportunity, through the research foundation, for Federal and state agencies,the private sector and universities to cooperate in those things each does best or has responsibility for.

The Federal government averages spending in the neighborhood of $10 billion dollars per year on water and closely related programs. A water research foundation with the ability and funding to focus research on the Nation's more critical issues, while avoiding some of the duplication that exists because of the large number of agencies, organizations and individuals, will be able to provide better research for the dollar spent. The Water Research Foundation will be able to plan for the Nation's research needs and to make this research more effective by having, within the Foundation, the charge to disseminate the research results. We see this as a necessary and beneficial activity of the Federal government

An Equal Opportunity Affirmative Action Institution

because of its broad constitutional and proprietary interest in water resources as well as for its ability to address many of the common needs of the entire Nation.

We believe this bill provides an appropriate level of funding and a long term commitment, both long needed in the water resources business, to provide better answers for our water resources development and management needs. This Research Foundation Act will provide our Nation with the opportunity to use the best brains, facilities and imagination in the United States to solve our water resources issues. We believe it also provides an opportunity for our university and others to participate on a long term basis in those things we dc best -- basic and applied research, training of scientists and professionals and providing knowledge about our water resources to those who may need it.

I urge and encourage this Congress to adopt the "Water Research Foundation Act of 1985" in order to support the best research, development and information services available from our scientists to address the increasingly critical issues of planning, development and management of our Nation's water resources.

We appreciate your interest in this matter and the opportunity you have provided for our comments.

Sincerely,

Fred C Davison

Fred C. Davison
President

FCD:jf

cc: Senator Nunn
Senator Mattingly
Dr. Smerdon/NASULGC and UCOWR
Dr. Haimes/UCOWR

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF ENGINEERING
DEPARTMENT OF HYDROLOGY AND WATER RESOURCES
TEL (602) 621-3131

March 23, 1985

Senator Dennis DeConcini
U.S. Congress
Washington, D.C. 20515

Dear Senator DeConcini:

As a water resources researcher at the University of Arizona since 1963, I want to express my support for the proposed bill which would establish a National Water Research Council and two centers. This is the most forward looking piece of proposed legislation on water resources research that I have seen. There is little doubt that water problems will become more severe as pressures on the limited resource increase. A major well organized research effort will be required to meet the anticipated demands, in both quantity and quality.

The Water Research Act of 1984 provides important additional research support, especially for universities, but it does not address the broader issue of research planning and coordination as well as information transfer that the proposed bill does. If the present water research efforts were better coordinated and directed the useful results would be increased tremendously with the same budgetary level. However, increased financial support will be required to answer the critical questions in a timely fashion.

I met with Patti Lynch a couple of weeks ago and we discussed the proposed bill and other water issues coming before Congress. I was very favorably impressed with her knowledge of water policy, etc.

Until June 1, I will be in the Washington area while on sabbatical leave. If I can be of assistance in any way to you or your staff, please feel free to contact me. My local phone number is (301)439-9666. A brief resume is enclosed.

Sincerely yours,

Daniel D. Evans

Daniel D. Evans
Professor

STATEMENT OF WILLIAM B. LORD
CONCERNING SENATE BILL 904
TO ESTABLISH A NATIONAL WATER RESEARCH FOUNDATION

June 14, 1985

Federal funding for water resources research has declined precipitously in recent years. Yet the increasing seriousness of the nation's water problems is widely recognized. Furthermore, the inadequacy of traditional remedies to address those problems grows steadily more apparent. As a result, we are in a period of rapid innovation in the ways in which we manage our water resources. Research to assist and illumine that process of innovation was never more needed. S. 904 is a welcome and considered response to the challenge posed by this situation.

S. 904 would authorize a program of expanded research and information dissemination. It provides a mechanism for isolating that program from partisan political control, from special interest pressures, from federal agency missions, and from the short-term fluctuations in priorities which can be so damaging to sustained research productivity. Yet this bill ensures that research will be responsive to real national needs, and not just to the whims of individual investigators. It further places emphasis on regional and national water problems, which are otherwise likely to receive inadequate attention from a system of state supported and controlled research.

S. 904 recognizes and supports the water resources research and information dissemination system which has evolved over the past two decades. The nation has a considerable investment in this research community, and it can be mobilized quickly to even greater effectiveness by the encouragement, support, and direction which this legislation would provide. If anything, S. 904 could be even more explicit in its recognition of the need to strengthen and enhance this existing resource.

The emphasis given in S. 904 to water problems of regional and national concern is welcome. However, serious problems still remain at the state and local level. It is unrealistic to expect that state and local governments, which are unaccustomed to supporting major research programs and which often find it difficult to take a long-range viewpoint when immediate problems are so pressing, will provide adequate support for the research which, in the longer term, may be most valuable to them. Prevailing attitudes and modes of political response change slowly, and the shifts of the last few years have diminished federal support for needed research so rapidly that state and local mechanisms have not evolved to fill the gap. For the moment, at least, the situation demands a continued federal effort in support of research on serious water problems, even those which may be geographically confined, as the Congress has so wisely recognized.

WWEMA

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July 11, 1985

The Honorable David Durenberger
Chairman, Subcommittee on Intergovernmental Relations
Committee on Governmental Affairs
SD 340
Washington, DC 20510

Dear Mr. Durenberger:

The Water and Wastewater Equipment Manufacturers Association appreciates the opportunity to present our views on the proposed Water Research Foundation.

WWEMA is a 77-year old organization of over 125 corporations that develop technology for and manufacture and supply equipment, materials and services to the water supply and water pollution control industries. Our plants, in nearly all 50 states, employ some 50,000 people.

WWEMA believes that water will, indeed, be the "issue of the 1990's," requiring, even demanding, increased attention. In the past year, increased recognition has been given to the need for better management of our water resources; this recognition goes hand in hand with a realization that there is not a lack of water in the nation but a lack of good management as well as less than adequate coordination among the organizations involved in managing the nation's water resources.

As you stated during the June 20, 1985 hearings on the proposed Water Research Foundation, and as Senator DeConcini recognized when he introduced S 904, there is an abundance of raw data on water. However, this raw data is scattered among numerous federal agencies and private organizations that do not always share either their research efforts or their research results. To cite just a few of the myriad organizations conducting water research and the types of information they collect: the US Geological Survey collects data on the location and amount of the nation's water resources; the Environmental Protection Agency studies methods of decreasing groundwater contamination and of limiting pollution of the nation's waterways; the AWWA Research Foundation conducts research on the health effects of contaminants in drinking water; and the National Governors Association, in conjunction with the Conservation Foundation, is studying groundwater pollution.

As suppliers of technology used for treating our nation's water resources, WWEMA members continue to dedicate their research efforts, and dollars, to developing new techniques for improving the quality of the nation's water supplies through conservation and reuse. The manufacturing community believes in the value of research as well as in sharing the results of that research. While WWEMA members respect the proprietary nature of specific technologies developed in response to a particular water pollution problem, they feel that answers to pollution problems, whether for potable or waste waters, will come only with the availability of research results to all those involved in the field.

The Water Research Foundation established under the Water Research Foundation Act, S 904, would include a water research planning center and a water information clearinghouse. WWEMA believes there is a critical need at this time for a water information clearinghouse; the same claim cannot be made for the proposed water research planning center.

The clearinghouse would make credible information available to the public (including businesses, government and academia) as well as to water professionals. The function to be served by the proposed clearinghouse is currently missing from the water research field. Exchange of information and available data is essential to ensuring efficient allocation of tight research dollars.

Given the tight budgetary constraints facing both the nation and the water industry, WWEMA believes that a national clearinghouse for water research data would reduce the likelihood that available research funds will be spent in duplicative efforts. Researchers should be encouraged to list ongoing research topics and projects with the clearinghouse. Organizations should then be encouraged to contact the clearinghouse prior to beginning a research project to determine whether a federal agency or another organization has conducted similar research. Such actions should prevent, to a large extent, expending scarce research dollars to "recreate the wheel."

Thus, WWEMA supports the creation of a national clearinghouse on water research activities and the resulting exchange of information among water researchers.

However, WWEMA cannot, with equal conviction, support the proposed water research center to promote and support water research activities in existence in states and make recommendations for long-term water research needs. There is currently a plethora of research activities focusing on water problems in the United States. Because of the amount of research currently underway in this country, WWEMA sees no need for a federal agency to either support ongoing research or to provide "incentives" for additional research.

WWEMA shares your concerns about the pricetag attached to S 904 and the potentially excessive investment of federal funds in yet another national agency. In this time of budgetary constraints and excessive federal deficits, WWEMA cannot in good conscience support creation of the proposed research planning center. The government currently supports myriad research activities, both by federal agencies and by private organizations receiving federal grants, through individual agency budgets; we see no reason for the federal government to begin supporting private research efforts as well.

What is needed is neither additional research nor additional funding for research but rather coordination of existing research efforts. This goal will best be served through the water information clearinghouse proposed in S 904, a program that can be established with a minimal investment of federal dollars.

WWEMA believes that with Congress, EPA, the industry and public interest organizations working together, we will be able to satisfy the nation's needs for sufficient data on the quality and quantity of water available without an excessive expenditure of additional funds. WWEMA would welcome the opportunity to work with you and your staff to assure passage of a modified, less costly version of the Water Research Foundation Act than that proposed in S 904.

Thank you for your attention to our comments and concerns.

Sincerely,

J. ROBERT NICHOLSON
WWEMA Chairman of the Board

cc: The Honorable Dennis DeConcini

TESTIMONY ON S.904

June 20, 1985 before the

Subcommittee on Intergovernmental Relations
The Honorable David Durenberger, Chairman, presiding

by Prof. James C. Warman, Chairman
National Association of Water Institute Directors, and
Director, Water Resources Research Institute
202 Hargis Hall, Auburn University, AL 36830 (205) 826-5075

I am James C. Warman, Director of the Water Resources Research Institute of Auburn University in Alabama. I appreciate the opportunity to provide this testimony on behalf of the National Association of Water Institute Directors and the 54 universities throughout the United States that are the administrative seats of the Water Resources Research Institutes, supported in part under programs authorized by P.L. 98-146. Comments in this testimony reflect individual discussions with most of the 54 water institute directors about S.904.

We are pleased to see in S.904 an expression of the keen interest of the sponsors in providing a mechanism for organizing and managing a water resources research program. The levels of authorized funding in S.904 document the perception of the sponsors of the seriousness of water resources problems throughout the United States and their confidence in research and the timely use of the new technology from that research as critical to the solution of those problems. I offer the following comments and suggestions:

1. A few water institute directors are strongly supportive of S. 904.

2. Most water institute directors have reservations about support of S. 904 in its present form.

3. The goals of S. 904 are already incorporated in the Water Resources Research Act of 1984 (P.L. 98-242) with the exception of coordination of research among the Federal agencies (assuming that is intended in S. 904). The Congress might better provide direction and adequate funds for the programs under P.L. 98-242 and other established research activities.

4. Governance of a technical program by political appointees is a weakness.

5. S. 904 has no structure for state or regional input.

6. S. 904 appears to be a revision of the National Water Alliance bill. It unfortunately ignores the recommendations in the study done in 1984 by the Chesapeake Research Consortium for the Council on Environmental Quality. There is no documentation of the need for a central facility such as the proposed Water Research Planning Center.

7. The existing "information houses" (NTIS, CRISS, WRSIC, NAWDEX, etc.) already perform the functions of the proposed Water Information Clearinghouse. The Congress could build on those existing excellent systems by providing direction and funds.

We water institute directors would welcome the opportunity to discuss in detail with your Subcommittee ways of meeting the need for new technology and moving it promptly into use for solution of water resources problems.

Valley National Bank of Arizona
HEADQUARTERS: PHOENIX, ARIZONA

J. ROBERT WHITE
VICE PRESIDENT & SPECIAL
ASSISTANT TO CHAIRMAN

P.O. BOX 71
PHOENIX, ARIZONA 85001

June 4, 1985

The Honorable Dennis De Concini
United States Senator
328 Hart Senate Office Building
Washington, D.C. 20510

Dear Dennis:

Thank you for sending me a copy of your bill to establish a Water Research Foundation and your remarks made on the floor of the Senate when you introduced this measure.

I support and encourage your initiative in introducing this bill because I believe our nation's current water problems are just the beginning of a growing epidemic. If solutions are not found through the support of basic research and the dissemination of information, the cost to the citizens of our country will be increasingly multiplied.

Because the water problems are of so vast an array (supply, quality, ownership, financial, aging systems, drought, flooding, topographical, climatological, competition with other public issues), I believe solutions must provide for regional differences. However, I believe your analogy with the National Science Foundation provides an insight to the value of a National Water Foundation, such as you propose, to address this national dilemma relating to water.

Sincerely,

Bob

Water Management in Transition 1985

> Water is in transition. Uses, values, demands, financing, even our water law and institutions are evolving as we move from an era of unconstrained growth to one which has to focus more on the best use of limited resources.
>
> Bruce Babbitt
> Governor of Arizona

A Special Report by the Freshwater Society

Christine Olsenius, Society Director
Linda Schroeder, Editor
Jones Rossi Company, Graphic Design
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The Freshwater Foundation, Publisher

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The Special Report is an annual publication of the Freshwater Society. For more information or additional copies of this report, contact the Freshwater Society.

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The Freshwater Foundation is a nonprofit corporation which built and equipped the Gray Freshwater Biological Institute, an international research center devoted to the multi-disciplinary study of the complex problems of freshwater. In 1976, the Institute was donated to the University of Minnesota. The Foundation continues to fund and support the Institute as well as national and international freshwater programs.

To help translate and interpret freshwater issues for the public, the Foundation formed the Freshwater Society, an international membership organization which supports freshwater research and public information programs. Through conferences, publications, television and radio programs, the Freshwater Society brings accurate information to the public on all aspects of freshwater issues.

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Perspective

Christine Olsenius
Director
Freshwater Society

The current federal deficit is dramatically and irrevocably changing the present system of water management in the United States. With estimates of hundreds of billions of dollars to rebuild and maintain the current water infrastructure, the scarcity of federal dollars highlights public concern over how and by whom the infrastructure will be maintained as well as when and how water supplies and water quality will be maintained. The trend in national water management is to return increased responsibility to the states, but this responsibility is not being coupled with corresponding financial assistance.

The trend toward decentralized responsibility and local financing, together with increasing competition for usable supplies, is forcing changes in how water is used, allocated, priced and managed. These changes will test the resiliency of this country's social, economic, political and legal institutions.

These changes will test the resiliency of this country's social, economic, political and legal institutions.

During this time of transition, the Freshwater Society has noted many examples of institutions beginning to change to meet emerging needs:

—Coalitions of water agencies and organizations are developing which cross bureaucratic, geographic and political boundaries.

—Management efforts are beginning to integrate quality and quantity, surface and groundwater, structural and non-structural approaches.

—The public and private sectors are joining together to develop management plans and financing options for water projects.

—Greater emphasis is being placed on regional, watershed-based planning and priority-setting.

This current period of transition from federal control and subsidization to state control and public/private financing presents a unique opportunity for enhanced water management.

The effect of these forces will be a slow, painful shift from political subsidies to a national, equitable, economic plan for long-range water management.

In this report, the Freshwater Society has assembled examples of those forces at work, as well as commentary on the present and future implications of those forces from leading lawyers, economists, politicians and policymakers.

As a nonprofit, non-advocacy foundation which supports research and public education related to freshwater, the Freshwater Society has been monitoring and studying water issues for 15 years. We feel this current period of transition from federal control and subsidization to state control and public/private financing presents a unique opportunity for enhanced water management.

It is hoped that this special report will highlight the many innovative responses to that challenge now taking place throughout the country, thus offering a framework for action in these changing times.

Christine Olsenius
Christine Olsenius

PART I:

A Federal Perspective

An emerging partnership between the federal government and the state and local sponsors of water projects provides the opportunity to forge a new consensus . . . for meeting tomorrow's water needs.

Major General John F Wall
U.S. Army Corps of Engineers

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Progress Toward a National Water Policy

Theodore M. Schad
Executive Director
National Ground Water Policy Forum
and
Executive Director
National Water Commission 1968-1973

Discussion of the need for a national water policy is not new. The 1973 report of the National Water Commission focused on seven themes which, 12 years later, can serve to show us how far we've come — and how far we have yet to go.

In some circles it is popular to deplore the lack of a national water resources policy and to predict a national water crisis with economic consequences more dire than those caused by the "energy crisis" of the 1970s. Before succumbing to the malaise of doom and gloom engendered by such predictions, however, it is well to look at what has actually happened in the water policy field in the past decade and where we appear to be heading.

The epochal report of the National Water Commission issued in June of 1973 provides a convenient benchmark from which to start. The Commission was created by act of Congress in 1968 as an outgrowth of the controversy over the use of the waters of the Colorado River Basin. Authorization of the Central Arizona Project created a situation wherein the demands for water in the lower Colorado River Basin exceed the long-term average supply. Rather than have the Congress address this problem through studies directed only at the Colorado River Basin, the Bureau of the Budget suggested an objective study of all the water problems of the entire United States, leading to policy recommendations aimed at solving future water problems.

The massive report of the Commission remains in official limbo.

A Review of the Nation's Water Problems

The legislation creating the National Water Commission directed it to review all present and anticipated national water problems, to identify alternative ways of meeting water requirements, to consider the economic and social consequences of water resources development, to provide advice to the President and the Water Resources Council upon request and to report on its studies simultaneously to the President and the Congress.

The Commission was chaired by Charles F Luce and consisted of seven members appointed by Presidents Johnson and Nixon. None of the Commission members was permitted to have any other federal government position. With the $5 million appropriated for its work, the Commission directed a wide-ranging and objective program of studies of all aspects of water resources policy. It published over 60 background studies, held hearings on its studies and on the draft of its report, and received input from over 7000 individuals and institutions that commented on its draft report. After consideration of the comments received, the Commission transmitted its final report to the President and the Congress on June 14, 1973.

It is widely understood that water demands are influenced by government policies.

Unfortunately, the concluding step contemplated by the National Water Commission Act, transmittal of the Commission's report by the President to the Congress with his comments and recommendations for legislation, was never completed. The massive report of the Commission, ***Water Policies for the Future***,[1] with more than 200 recommendations for improving national water policy, remains in official limbo. Nevertheless, the Commission's report has had a considerable impact on the evolution of national water policy in the past 10 years, and many of its recommendations are being implemented.

Findings Based on Seven Themes

In its brief summary report, ***New Directions in U.S. Water Policy***,[2] transmitted to the President and Congress on June 28, 1973, the Commission identified seven recurring themes that emerged from its studies and provided the foundation for its conclusions and recommendations. **First**, the demand for water in the future is not on an inevitable growth trend but depends in large part on policy decisions within the control of society. **Second**, the Commission saw a shifting of national priorities away from water development toward preservation and enhancement of water quality, including uses of water for recreation, aesthetics and preservation of the balance of nature.

In identifying these first two themes, the Commission was reporting its agreement with the findings expressed in a number of its studies. Events during the past 10 years confirm the significance of the Commission's observations. The concept of alternative futures espoused by the Commission is reflected in the best planning operations, and it is widely understood that water demands are influenced by government policies.

The inexorable laws of economics appear to be leading to the conservation of water through reduction of losses and increased efficiency.

The U.S. Water Resources Council, in its ***Second National Assessment of Water Supply and Demand***,[3] included estimates of future demands in the several water resources regions under two sets of assumptions. The report forecasts lower water use in certain industries in the decade ahead as a result of increased recycling and greater efficiency in the use of water. Likewise, the shift in national priorities noted by the Commission is continuing as legislation enacted prior to the Commission's report is implemented and as public interest in environmental preservation is stimulated by the activities of environmental groups.

The Land-Water Connection

The remaining themes epitomized the substance of the Commission's principal recommendations. Thus, the **third** theme dealt with the need to tie water resources planning more closely to land use planning. Efforts to do this under the Water Resources Planning Act of 1965 were not very successful. A great many plans were prepared that lacked public support and could not be implemented.

One reason for the difficulty of producing successfully integrated and acceptable plans may well be that responsibilities for land use planning are in state and local governments, while water planning activities have been largely dominated by federal agencies. The experiment now under way in the Red River Valley of the North, attempting to develop a "grass-roots" approach to water management, might, if successful, lead to effective integration of land and water planning.

Beneficiaries of water projects should pay for them through user charges.

Reduced Losses, Increased Efficiency

The inexorable laws of economics appear to be driving the nation to acceptance and implementation of the Commission's **fourth** theme, expressed in its recommendation for policies leading to the conservation of water through reduction of losses and increased efficiency. Recent statistics on water use in industry show substantial reductions in water use per unit of output.

Increasing domestic water bills, as the costs of developing new water supplies rise, will have the same effect on per capita water use. Events such as the California drought and increases in the cost of energy for pumping in the mid-1970s helped lead to reductions in water use for irrigation.

A System of User Charges

The Commission's **fifth** theme, calling for sound economic principles in water resources decision-making, led to its recommendation that, to the extent practicable, beneficiaries of water projects should pay for them through user charges. Both the Carter and the Reagan Administrations adopted this policy, but it is not yet accepted as a general principle by the Congress.

The increasing budget deficits, which make it harder to obtain federal appropriations for water projects, may well provide the impetus for acceptance of the user charge principle on the federal level; it has always been a dominant consideration in locally financed projects.

A Re-examination of Laws

The **sixth** theme, dealing with a re-examination of laws and legal institutions governing water resources in the light of contemporary water problems, is being implemented piecemeal. Among examples that could be cited are the provisions of the Water Resources Development Act of 1974, dealing with floodplain management, and the 1982 Reclamation Reform Act. While the Commission's recommendations for elimination of subsidies in these areas have not been fully accepted, some progress has been made. The impact of budget deficits will be felt in this area, also. With respect to groundwater law, singled out by the Commission for special attention, the re-examination appears to be taking place in the courts, via the ***Sporhase*** and ***El Paso*** decisions.[4] The full impact of these decisions is difficult to foresee, but it will undoubtedly lead to greater understanding of the value of groundwater and probably to revision of existing law governing the use of groundwater.

The increasing budget deficits may provide the impetus for acceptance of the user charge principle on the federal level.

Increased Local Control

The Commission's **seventh** and final theme was the statement of its belief that development, management and protection of water resources should be controlled at that level of government nearest to the problem with powers which give it the capacity to represent all of the vital interests involved, and that the role of the federal government in the planning and financing of water programs should gradually diminish.

Here, again, the federal budget deficit is becoming a driving force. As state and local governments find their projects deferred, waiting for federal funds, while inflation pushes costs higher, they may find it more economical to take action to meet their needs on their own.

Development, management and protection of water resources should be controlled at that level of government nearest to the problem with powers which give it the capacity to represent all of the vital interests involved.

Where We Stand...

Judgments as to progress toward the improvement of national water policy are necessarily subjective. It seems, however, that the seven recurrent themes identified by the National Water Commission in its studies are still the driving force behind progress on water resources policy — aided by the Reagan Administration through its budgetary policies.

Dark clouds loom ahead, to be sure, on the nation's water resources horizon. Encroachments on floodplains and anthropological alterations of watersheds are causing an increase in average annual flood damages. Toxic wastes are polluting groundwater in many areas. Consumptive use in some basins exceeds the available supplies. Groundwater is being over-pumped in several basins. The water infrastructure in our older cities is deteriorating. The best and lowest cost projects have been built first, and the cost of development of new supplies is exorbitant.

Public understanding of the problem is growing.

. . . and Where We're Going

The sun, however, is beginning to shine in some places. Public understanding of the problem is growing. The tools available for solving problems are being improved. Decreasing availability of federal funds is forcing decisions on local water problems to be made by state and local agencies. Nearer to the problem, these agencies should be able to develop more cost-effective and efficient solutions. Above all, the nation is richly endowed with water resources.

We are not going to run out of water, but we are going to have to take better care of what we have. We have a long way to go to achieve a sound water management philosophy that will permit needs to be met in the future. The National Water Commission pointed the way in 1973. It's time to get on with the job.

We are not going to run out of water, but we are going to have to take better care of what we have. We have a long way to go to achieve a sound water management philosophy that will permit needs to be met in the future.

About the author: Theodore Schad is executive director of the National Ground Water Policy Forum and a consultant on matters relating to water resources and the environment. He was executive director of the National Water Commission from 1968 to 1973, and also served as staff director for the Senate Select Committee on National Water Resources from 1959 to 1961.

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Trends in Water Management

Edwin H. Clark II, Ph.D.
Senior Associate
The Conservation Foundation

Change is always a slow process, and water management is no exception. We are beginning, however, to confront certain realities about water — realities that will change forever the ways we view and manage our water resources.

Superficially, very little seems to be happening in relation to water resource policy. When we look more carefully, however, we can see some dramatic trends. Inexoribly, we are being forced to deal with some fundamental water resource issues, to answer some basic questions on how we are going to use our finite water supplies.

As in the past, we may dream of ways to avoid these issues — sucking water though giant straws from the Great Lakes or the Yukon River, making freshwater from the oceans, bringing Alabama's climate to Colorado through weather modification, or other wondrous fixes. Increasingly, we are realizing that they are only dreams. We may attempt to ignore reality — as we have done in the Colorado River Basin — by authorizing more projects and more allocations than there is water available. Increasingly, however, we are recognizing that our supplies are, in fact, limited.

We are being forced to deal with how we are going to use our finite water supplies.

Confronting Reality

Although retreats to dreams and willful ignorance will undoubtedly persist, we are steadily being pushed, by a combination of factors, to confront reality. The most important factor is, of course, that only so much water is available. As our demand for it increases, we cannot continue to avoid difficult decisions about how the available supplies will be allocated or reallocated. We are past the point where the answer to every question can be "build more dams." There may be nothing to fill them with.

We are past the point where the answer to every question can be "build more dams." There may be nothing to fill them with.

A second factor is the economic and budgetary trends of the past decade — trends likely to continue for the foreseeable future. We often cannot afford to build new dams even if there is water to fill them, much less pay for transporting the Great Lakes to Texas.

A third trend is that many more people are getting into the decision-making process. The previously exclusive domain of a relatively limited number of water users must now be expanded to include environmentalists, Indians, academics, recreationists and taxpayers.

Many more people are getting into the decision-making process.

There is every reason to expect that these trends will only intensify over the foreseeable future, forcing us to deal with some basic policy questions regarding both water quantity and water quality. Who is going to decide how we use our water? Who is going to pay for our water policies? And most fundamentally, what do we want to use our limited water supplies for?

The Federal Response

The federal government has made very little progress in answering any of these questions. It has dismantled the institutions responsible for formulating and analyzing water policies; reduced the amount of the information it collects, as well as (through budget and personnel cuts) its ability to use that information effectively; and made it generally more difficult for the public to obtain the information that is collected.

On both water quality and water quantity issues, the Administration did attempt to give more responsibility for making decisions to the states, but, perversely, it simultaneously reduced the resources the states had available to make these decisions. It also abolished the primary institutions responsible for collecting information and promoting decisions on interstate water issues, the river basin commissions. In the end, about the only contribution the federal government has made to the "who decides" question is to demonstrate that it won't.

The State Response

About the only contribution the federal government has made to the "who decides" question is to demonstrate that it won't.

Somewhat more progress has occurred at the state level in dealing with these issues. A number of states have begun to address the question of what they want to use their water for. Some Western states have given signs that they recognize a need for reallocating water away from such traditional uses as irrigation. Eastern states, beginning to recognize that their supplies are finite, are adopting water allocation and management schemes—often similar to those adopted long ago in the West—suitable for a resource that is not only finite but valuable.

They have also begun to include more people in the decision-making process. Colorado has established its Denver Water Roundtable and New Mexico its Water Law Study Committee, each of which contains members who are not representatives of traditional water interests. The states are also generally more aggressive in attempting to deal with the question of who pays. Behind the expected political posturing, they seem to have taken the threat of cost-sharing changes seriously and have attempted to figure out how they are going to pick up more of the bill.

Eastern states are adopting water allocation and management schemes — suitable for a resource that is not only finite but valuable.

Imperceptible—Yet Dramatic—Changes

Thus changes are taking place, by necessity if not desire. On a year-to-year basis, these trends may be hardly noticeable, but when viewed over a period of 5 to 10 years, they are dramatic. A largely new generation of Western water managers is seriously discussing such concepts as instream flow, incentives for water conservation, markets and banks for water rights, better water management, and reallocation of finite supplies — concepts that were largely anathema 10 years ago. And they are discussing these concepts with people that they would then have dismissed as irrelevant. We have yet to abandon the magnificent (and perverse) paradox that water is so valuable that it should be given away free—but even here there is some movement.

We have yet to abandon the magnificent (and perverse) paradox that water is so valuable that it should be given away free.

The movement toward more rational and efficient water resource policies and allocation systems will continue. Its major characteristics will be increased emphasis on better management of what we have rather than developing new sources, increased interest in markets for water rights, and a continued effort to include more parties in the decision-making process.

Will we see any startling changes in any of these directions? Probably not. If there is no water shortage or other crisis, the movement is likely to be slow. If there are shortages, the movement may be faster. The direction of the movement is clear: the only uncertainty, its speed.

About the author: Dr. Clark directs the water resources program at The Conservation Foundation, a nonprofit policy research institution in Washington, D.C., and was project director for the Foundation's 1982 and 1984 reports on the state of the environment. He holds advanced degrees in water resources engineering, public policy and economics. Before joining The Conservation Foundation, he held senior positions at the Environmental Protection Agency and the Council on Environmental Quality.

Water Allocation: The New Rules of the Game

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Who owns water? What rights come with ownership? When does need take precedence over ownership? And, most important, who gets to decide? Since the Supreme Court ruled in favor of a Nebraska farmer, the rules of water allocation, use and ownership may never be the same.

When, in 1976, the manager of the local natural resources district in Nebraska told Joy Sporhase that he could not irrigate the 160 acres that he and Delmar Moss, his son-in-law, owned in Colorado with the well that was located on his Nebraska land adjoining the state line, he couldn't believe his ears. He and his son-in-law had just bought the farm, the well was there, and it had been used to irrigate the Colorado land as well as the Nebraska land.

Joy Sporhase went to see his lawyer. When Richard Dudden, the Ogallala lawyer who later carried the Sporhase case successfully all the way through the United States Supreme Court, told Sporhase that the Nebraska statute did forbid the use of the Nebraska well water on the Colorado land, Sporhase said, "That's not right, and I'll take the case to the United States Supreme Court if necessary."

Every lawyer hears those words from time to time and never has taken them seriously, but Sporhase, turned down by the local management district, turned down by the Nebraska District Court, and turned down by the Nebraska Supreme Court, persevered.

He appealed to the United States Supreme Court and, in a ruling which will have repercussions for a long time to come, the Court determined that water is an article in interstate commerce, that no state can make rules which impose an impermissible burden on interstate commerce, and that the Nebraska statute imposed such a burden.

In a ruling which will have repercussions for a long time to come, the Court determined that water is an article in interstate commerce.

The Repercussions...

At the time the United States Supreme Court issued its ***Sporhase*** ruling in July of 1982, there was pending in the United States District Court in New Mexico a suit filed in 1980 by the city of El Paso, Texas, against the State Engineer of New Mexico.

El Paso, a rapidly growing city of 450,000, found itself in need of an additional water supply and determined that wells located in the alluvium of the Rio Grande in New Mexico would be the most feasible source of that supply. El Paso, therefore, filed 326 well permit applications with the State Engineer of New Mexico. These wells would withdraw water from the Hueco and Mesilla Bolsons (basins) just across the New Mexico state line from El Paso.

The State Engineer denied all of these applications, relying on a New Mexico statute prohibiting the transport of underground water out of New Mexico.

The trial court held, relying largely on ***Sporhase*** (which had been determined by that time), that the New Mexico groundwater embargo violated the commerce clause of the United States Constitution and that the defendants would be enjoined from enforcing that embargo. That ruling was appealed to the Tenth Circuit Court of Appeals and, while the case was pending on appeal, New Mexico amended its laws in an attempt to avoid imposing an impermissible burden on interstate commerce.

New Mexico tried to get the Court of Appeals to dismiss the case because of the new legislation, but the Court of Appeals refused to do that and sent it back to the District Court for further hearings.

The District Court found part of the new legislation invalid but sustained most of it, and the 326 applications by El Paso for wells in New Mexico are now pending before the State Engineer, and the decision on the granting or denial of those well applications will come in due time.

. . . and the Implications

What does all this mean to anybody?

It means that state lines are no longer barriers to the transfer of water. It means that the so-called "state ownership" of water is a fiction. It means that, while movement of water interstate can be restricted "to conserve and preserve for its own citizens this vital resource in times of severe shortage," the legislation must be even-handed in its application to residents as well as non-residents.

State lines are no longer barriers to the transfer of water.

The *Sporhase* and *El Paso* decisions have rekindled interest in interstate water sales. Water has been sold and re-sold intrastate for a profit for years, but interstate sales for profit are now being envisioned. Many water agencies take the position that unneeded water should not be the source of profit but should be available for those who are in need. One proposal in particular has stirred up controversy along the Colorado River.

Selling Water for Profit

An article in the January 16, 1985, issue of the ***Rocky Mountain News*** reports that investors called the Galloway Group, Ltd., plan to deliver water from northwestern Colorado to San Diego.

The general manager of the San Diego County Water Authority was quoted in an article in the ***Los Angeles Times*** on January 6, 1985, as saying:

> The idea isn't going to go away, especially when potential sellers out there see how much money we're promising. The willingness to pay for water opens up a whole new way to divide water.

The willingness to pay for water opens up a whole new way to divide water.

The proposed purchase of water has brought San Diego into sharp conflict with the powerful Metropolitan Water District, the current supplier of water to both the Los Angeles and San Diego areas. The ***Times*** article states:

> Agencies should not consider paying a price for water that includes a profit for the seller, according to the argument of the MWD and other traditionalists. In particular, MWD and its allies fear that the willingness of San Diego to buy water hurts the chances of Southern California to convince the northern half of the state to permit additional development of the State Water Project.

Is it morally right for individuals or companies to make money from the sale of a commodity as essential to life as water?

Galloway is also negotiating with other prospective purchasers in California, Utah and Arizona.

The Colorado Water Conservation Board and state agencies in the Colorado River Basin states oppose the private water supply plan. Litigation seems inevitable.

More Questions Than Answers

The legislature of New Mexico, when faced with the ***El Paso*** decision, created a water law study committee. The first recommendation of that committee's report, submitted in July 1984, is the following:

> The state should make every effort possible to have the Congress of the United States act in some way to allow New Mexico to maintain its water resources within its boundaries.

Will the Congress enact the kind of law New Mexico wants? Should it? Or should the marketplace determine who gets the water?

Americans have always lauded free enterprise. Is it morally right for individuals or companies to make money from the sale of a commodity as essential to life as water? Should water belong to the state, so that profits from the sale belong to all of the people? Or should water in the ground belong to the owners of the ground, like coal or oil?

For example, should New Mexico put a tax on all of its groundwater — that used in New Mexico as well as that exported — and use the proceeds to drill wells in Colorado where there is much more water in storage?

These are only a few of the questions that the new freedom to transfer water raises, and there seem to be more questions than there are answers.

The Future of the Ultimate Reservoir

Many marginal agricultural rights will be changed so that the water will be available for more economically advantageous municipal and industrial use.

"The Great Lakes," says the ***Wall Street Journal*** of February 5, 1985, "are the Ultimate Reservoir. They contain 95 percent of the surface freshwater in the U.S., fully 20 percent of the world's surface water."

The governors and premiers of eight U.S. states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin) and two Canadian provinces (Ontario and Quebec) have entered into an agreement to embargo diverting water outside the Great Lakes Basin.

It won't do any good, though, according to Professor Joseph Sax of the University of Michigan, a noted water law authority. He states in the ***Journal*** article: "Even though many sympathize with an embargo on diverting water outside the Great Lakes Basin, you can't do it. The Supreme Court says we can't . . . . This is just blowing hot air for political consumption."

While this state of transition continues, increased emphasis on conservation of our limited supplies will increase, and many marginal agricultural rights will be changed so that the water will be available for more economically advantageous municipal and industrial use.

"The Struggle Has Begun"

Nothing comes easily in the allocation of water.

So long as there are states that see interstate water transfers as their principal source of additional water, legislation giving control back to the states of origin will have tough sledding in the Congress, although it seems clear that the Congress has the constitutional authority to regulate interstate commerce and has the power to control, regulate, prohibit or allow the export of state water.

Many say that "water seeks its own economic level," or, put more crudely, "water will flow uphill to money." These people see an open market as the most efficient way to allocate water resources, and their bets are on those who will make water available to willing buyers, regardless of the engineering, legal or people problems involved. Others believe equally strongly that state regulation and existing river compacts will prevail.

The outcome of the struggle is unclear and, at best, years away. The struggle, however, has begun and will continue until it is resolved.

Nothing comes easily in the allocation of water. As the old-timers say, "You can kick a man's dog, or you can steal his wife, but you'd better leave his water alone."

Water is not going to be "left alone" — nor will it ever be the same again, as the struggle continues to resolve the dilemma of a changing water allocation policy.

About the author: Raphael Moses has been practicing law in Colorado for 47 years, with special emphasis in the area of water law. He has served on numerous boards and commissions, including the Colorado Water Conservation Board, for which he was attorney for 18 years. He has represented Colorado in interstate water matters, and he is one of the founders and an early chairman of the Western States Water Council. He is also a noted author and speaker

Federal Water Management in Transition

Lawrence Mosher
Editor
Water Information News Service

Conflicting and overlapping authority among federal agencies provides institutional barriers to effective water management. To better address growing water problems, these interagency duplications and disagreements need to be replaced with a coordinated process of communication and cooperation.

"Haphazard."

This is the word the Labor-Management Group, composed of the nation's major labor and corporate leaders, picked to describe how the nation deals with its water resources. The result, concluded its study, ***Rebuilding America's Vital Public Facilities***, is "poor management" at all levels of government.

The tough indictment, issued in October 1983, came from board chairmen and presidents of such enterprises as Citicorp, the Bechtel Group, TRW, Exxon, General Motors, AT&T, General Electric, the AFL-CIO, Communications Workers of America and the United Steelworkers of America.

The major problem, nearly everyone agrees, is the fragmented federal approach to water. Twelve congressional committees — embracing a total of 23 subcommittees — deal with water resource issues. In the executive branch, water is administered by a total of 21 bureaucracies that live in one White House office, two presidential advisory groups, four federal departments and five independent agencies.

None of this is new. What is new is the rising tide of frustration with the federal institutional labyrinth as the nation begins to grapple with its worsening water problems.

What is new is the rising tide of frustration with the federal institutional labyrinth as the nation begins to grapple with its worsening water problems.

"It is not known with certainty how many federal programs deal with water supply and pollution," the Labor-Management Group study stated. "The Water Resources Council (authorized by the 1965 Water Resources Planning Act as an interagency group to coordinate planning) identified 25 federal water programs in 1974 that were approved by Congress in 70 different appropriations accounts. Even the Office of Management and Budget (OMB) does not know how much the nation spends each year on water programs."

A Lack of Coordination

The result, the study concluded, is the misallocation of "billions of dollars," a lack of coordination between water quantity and quality programs, the failure of water agencies to deal with the interdependence between surface water and groundwater, and government policies that conflict with each other to discourage water conservation.

The Environmental Protection Agency (EPA), for example, has financed dozens of sewage treatment plants that then dump effluent into the ocean instead of recycling it. And the Interior Department continues to supply subsidized water for Western agriculture — at prices that do little to discourage wasteful irrigation practices.

Water is still being treated as a political boon rather than as an economic, let alone social, asset. Rep. Robert A. Roe, (D-NJ), chairman of the Public Works and Transportation Subcommittee on Water Resources, lamented: "There ought to be, in the interests of the nation, just one committee that has total jurisdiction over water resources. But that's not going to happen. The political structure won't allow it."

. . . and a Loss of Structure

Under the present administration, federal policy-making is nearly at a standstill. James G. Watt, former Interior Secretary, did away with most of the federal and regional planning structures that did exist: the Water Resources Council, which the Carter Administration had attempted to use as a water project review board, and five river basin commissions.

"One of the clear losses is the demise of the Water Resources Council," notes David J. Allee, professor of agricultural economics at Cornell University. "It exercised what you might call the technical ombudsman role.

"All water agencies deal essentially with local problems. And if you have a problem, the business of coordination basically happens there. And it's in the nature of water, which is so ubiquitous and involves so many agencies, that coordination is always the problem.

"So if you have a problem and you're having trouble with the people you are dealing with directly in the agencies, where do you go? What do you do about it? You could go to your congressman, but that often is like trying to kill a gnat with a baseball bat.

"The Water Resources Council provided a way to get to the federal agencies that was legitimate. If there's one thing the folks out there miss, it's the link the Council provided. And nothing has supplanted its role. In the meantime, cooperation among the water agencies has decreased."

"You have to bring everyone into the process and make them partners. The federal government is just not going to provide it all anymore."

Interagency Conflict

Some water laws require cooperation among federal agencies to be implemented. In the realm of water management, however, such agency coordination has an uneven record.

At the beginning of this year, for example, EPA and the Army Corps of Engineers disagreed over the Corps' proposed revision of how it should carry out the 1969 National Environmental Protection Act (NEPA) concerning wetlands protection. This environmental statute requires anyone receiving federal money to predict the environmental impact of his actions. The required document, which can take years to prepare, is called an environmental impact statement, or EIS.

In March 1984, EPA reviewed and rejected the Corps' proposal, which sought to streamline some of the EIS procedures to simplify the often time-consuming and costly process. EPA argued that the Corps' proposal lacked coherency and specificity, and that it reduced the scope of the EIS analysis too far. The Corps, rejecting EPA's rejection, ordered that the changes be submitted to the Council of Environmental Quality (CEQ), which manages EIS procedures under NEPA. The White House is presently faced with handling this interagency conflict.

"We're all in this together. We are one nation. We must sit down and carve out a regulatory scheme that is driven by a sense of restraint combined with some standards at the federal level."

Another example of federal agency conflict involves the Army Corps of Engineers and the Interior Department's Bureau of Reclamation. The focus of the conflict is cost-sharing, the policy area which sets the governmental boundaries of water project financing: who pays for what and how.

William R. Gianelli, former assistant Army secretary for civil works, attempted to institute a federal cost-sharing policy that would have created uniform ratios between federal and non-federal money sources. He sought, for example, to require state and local governments to pay for at least 35 percent of all irrigation and flood control projects, regardless of whether they were built by the Corps of Engineers or the Bureau of Reclamation.

(Historically, the Corps of Engineers has relied on the U.S. Treasury to pay for all its projects, whereas the Bureau of Reclamation, established to "reclaim" the arid lands of 17 Western states, has required repayment—about 85 percent—over long periods at low or no interest.)

"The days of letting the federal government sit here in Washington and dictate what ought to be good for South Dakota or wherever are over," stated Gianelli. "You have to bring everyone into the process and make them partners. The federal government is just not going to provide it all anymore."

But Interior Secretary Watt disagreed and prevailed over Gianelli to win endorsement for a cost-sharing policy of "flexibility," which called for a "case-by-case" approach to project financing, so that the beneficiaries' "ability to pay" could be considered.

Environmental critics called this approach counterproductive and no policy at all. "By failing to ensure that all parties will be treated equally," the National Wildlife Federation's Jay D. Hair wrote President Reagan, "your policy is unlikely to achieve its stated purpose — increasing the non-federal share of water project costs." Sen. Pete V. Domenici, Republican budget committee chairman from New Mexico, summarized the concern of many: "I look around and I see that no one wants to pay for inland waterways; they want them free. They do not want to pay for ports; they want them free. They wonder why we are not spending new money on water projects. . . . We are not going to spend money on water projects because we do not have a water policy."

MOAs can be a significant instrument of cooperation between agencies whose effective interaction is of growing importance.

Case Study: Developing a Groundwater Strategy

One attempt begun during the Carter Administration to develop a federal interagency groundwater strategy at EPA was abandoned by then-EPA administrator Anne McGill Burford at the outset of the Reagan Administration. This policy was reversed when Burford and Watt were replaced by William D. Ruckelshaus and William P. Clark, respectively. Watt had opposed development of a groundwater strategy as chairman of the White House Cabinet Council on Natural Resources and Environment.

Arizona Governor Bruce Babbitt's response was critical: "Many of us governors were offended by what Jim Watt did; it was a purely political decision. The EPA had obtained suggestions for a federal-state approach to this, and Jim Watt simply said he was not interested, that the federal government has no role and would not be a player.

"The governors basically said Watt was wrong. We're all in this together. We are one nation. We must sit down and carve out a regulatory scheme that is driven by a sense of restraint combined with some standards at the federal level."

Congress still seems leery of addressing the awesome issue of water allocation on a national scale. In the meantime, the nation's water management problems continue to multiply.

Last August, EPA did announce a revised groundwater strategy, which set protection policies for three classes of groundwater: 1) those that are "irreplaceable" drinking water sources; 2) those currently or potentially needed for drinking water; and 3) those too polluted to drink. Many water specialists, however, believe more federal leadership is needed.

Early this year The Conservation Foundation and Gov. Babbitt announced the formation of a national groundwater policy forum to provide recommendations by early 1986. "The genie will be out of the bottle," Gov. Babbitt warned, "unless we deal with this on a national level."

MOAs: Groundwork for Cooperation

The EPA cooperates with many federal agencies, such as the Interior Department's U.S. Fish and Wildlife Service and the U.S. Geologic Survey, the United State Coast Guard, the Department of Defense, the National Oceanic and Atmospheric Administration and the Agricultural Stabilization and Conservation Service.

One important vehicle for encouraging communication and cooperation between such agencies is the memorandum of agreement (MOA), a written document spelling out the specifics of how the two agencies will cooperate in carrying out a mutual function, such as that of executing a particular statute. Such a formal agreement is sometimes mandated by a statute; other times it is initiated by the agencies themselves.

EPA's memoranda of agreement deal with ocean dumping and incineration at sea, the location of waste sites and sludge dumping sites, and the protection of the nation's bays, estuaries and soon the nation's groundwater. Although the MOAs are sometimes seen as little more than "mom and apple pie statements of intention," they can also be a significant instrument of cooperation between agencies whose effective interaction is of growing importance.

An Interagency Task Force

What looked to be a new bright note in governmental cooperation at the federal, state and local levels was the work of the Nonpoint Source Task Force convened last year by EPA. The unusual group of 27 members, which completed eight months of work in December 1984, represented 12 federal government groups and 11 state and local groups.

Early this year, this unique interagency task force offered its recommendations for a national nonpoint source policy to EPA administrator Lee M. Thomas. The report included implementation strategies dealing with interagency cooperation to "assure broader implementation of needed nonpoint source controls." The report, however, disappointed environmentalists monitoring the task force's work because it backed off an earlier draft that would have linked state nonpoint source control plans to EPA's state grants program.

Resolving the nation's water problems will not be an easy task. A structured program of cooperation, coordination and communication will be essential to assuring progress toward that end.

Cooperation, Coordination and Communication

Whether memoranda of agreement and interagency task forces provide enough structure to mend the fragmented federal approach to resolving the nation's growing water problems remains to be proven. As David Allee notes, the demise of the Water Resources Council has left a critical vacuum in the vital area of national water resource planning.

Although last year's water authorization bills proposed to replace this interagency vehicle, Congress still seems leery of addressing the awesome issue of water allocation on a national scale. In the meantime, the nation's water management problems continue to multiply.

"Memoranda of agreement notwithstanding, communication still takes people to make it happen," says Cornell's Allee. "Agreements help; you have to have these to clarify what you are doing. But with water issues, which are so political, nothing beats some kind of structure that makes the parties talk to each other regularly."

This federal approach to water is fragmented, and a viable planning structure is lacking. Resolving the nation's water problems will not be an easy task. A structured program of cooperation, coordination and communication will be essential to assuring progress toward that end.

About the author: Lawrence Mosher is a Washington, D.C.-based environmental writer. He is the editor of ***Water Information News Service***, a twice monthly newsletter on water resources, a contributing editor for ***National Journal***, a weekly magazine on government and politics, and the North American correspondent for ***Ambio***, published by the Royal Swedish Academy of Sciences.

The Corps of Engineers: Planning To Meet the Financing Challenge

Major General John F. Wall
Director of Civil Works
U.S. Army Corps of Engineers
and

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U.S. Army Corps of Engineers

As state and local governments are asked to assume increased responsibility for funding water projects, they are also beginning to seek an increased role in planning and determining priorities for such projects. The effectiveness of these closer "working partnerships" will require modification of procedures and institutions both within and among federal and non-federal agencies.

The Corps of Engineers exemplifies growing awareness by a federal agency of the need to adapt to changing times. In this official, unedited Corps paper, General Wall formally charts a course of significant change for the U.S. Army Corps of Engineers.

The Civil Works program of the U.S. Army Corps of Engineers makes a unique contribution to the development of our nation through water resources planning, development and management. Investments in flood control projects have prevented $146 billion in property damages at a cost of only $19 billion. Each year, 25,000 miles of waterways handle two billion tons of cargo, resulting in savings to consumers of about $1 billion over the next best transportation alternative. Corps reservoirs provide 7.8 million acre-feet of municipal and industrial water storage, serving millions of people; associated hydroelectric plants provide over one-quarter of the nation's hydroelectric capacity and generate about one-half of the energy provided by all federal power plants (fossil, nuclear and hydropower). Nearly 4,000 recreation areas at over 600 Corps reservoirs provide recreation opportunities to citizens who make nearly 500 million visits to them each year.

The development of new Civil Works projects is beset by a funding crisis — there are simply insufficient federal funds to start, finish and operate all needed projects.

Despite these notable contributions and the potential for additional productive investment, the development of new Civil Works projects is beset by a funding crisis — there are simply insufficient federal funds to start, finish and operate all needed projects. In the future, those who benefit must pay a greater share of the costs.

Therefore, state and local governments are being asked to bear a higher proportion of the costs of project planning and construction and to provide these funds early — during the planning and construction periods. Local governments and other non-federal participants will consequently demand a larger say in project planning and priority setting. Although this greater participation may result in more locally acceptable projects, it will require changes in the Corps of Engineers' planning, design and construction processes.

Federal/Non-Federal Partnership for Water Development

Initially, federal water development in the United States concentrated on navigation — to facilitate commerce and to "open the West." Over time, the federal role has broadened and now encompasses virtually all aspects of comprehensive water resource development. Federal water development provides widespread benefits, minimizes risks to human life, and achieves social and regional development goals.

Due to limited financial capability of non-federal sponsors and the fact that water resource developments are typically long-term investments characterized by uncertainty in future conditions, demands and revenue potential, the federal government has traditionally assumed the financial risks of project planning and construction. Traditionally, local and state sponsors generally provided lands, easements and rights of way; reimbursed some vendible outputs like water supply and hydroelectric power; and assumed some project operation and maintenance responsibilities.

Funding Cutbacks

Today we live in an era of limited federal funds, especially for water resources construction. Although the Corps' Fiscal Year 1985 budget is about the same as last year and larger than several years ago, funding for new project construction is about $1.1 billion; this is only 37 percent of the 1980 level and 25 percent of the 1967 level after adjusting for inflation.

Today we live in an era of limited federal funds.

There are several reasons for this decrease. Although the last authorization bill was in 1976, this Congress has not agreed upon and the President has not signed a comprehensive water resources authorization bill since 1970. The growing federal deficit makes it unlikely that major new federally funded water development can be undertaken today. There are competing demands for limited federal dollars, including those funds needed for the operation, maintenance, repair, rehabilitation and/or modification of existing projects. It is also unlikely that the trend toward smaller federal investments in water development will be reversed. If urgently needed projects are to be built, the country requires new financing arrangements.

During the past decade, traditional water project cost-sharing and financing (sponsor-provided lands, easements, and rights-of-way; reimbursement for vendible outputs over the life of the project) have been subjects of intensive scrutiny and divisive debate. The milestone report of the National Water Commission in 1973 recommended cost-sharing policy changes. The Carter Administration reviewed cost-sharing in the Ford Administration's "Section 80" study authorized by the Water Resources Development Act of 1974 and proposed, depending on the nature of the project purposes, that non-federal project sponsors should provide an additional five to ten percent of project costs "up front." These proposals generated a great deal of controversy, and achieved no consensus on cost-sharing and financing.

The period of turmoil may be about to end. An emerging partnership between the federal government and the state and local sponsors of water projects provides the opportunity to forge a new consensus.

The era of turmoil characterized by a gradual loss of consensus between the executive and legislative branches on water priorities and federal responsibilities resulted in a virtual halt in the congressional authorization process for new water projects. Of the 106 ongoing construction projects in the FY 85 Civil Works budget (down from 159 in FY 83), only six were begun after 1979. Meanwhile, there are about 200 projects involving about $13 billion of construction costs eligible for authorization; hundreds of projects, involving about $16 billion, already authorized, await funding for construction appropriations or de-authorization.

Policies for Project Cost-Sharing and Financing

The period of turmoil may be about to end. An emerging partnership between the federal government and the state and local sponsors of water projects provides the opportunity to forge a new consensus.

President Reagan, in his January 1984 letter to Senator Laxalt concerning water development, said, "It is time to conclude the discussion and to establish a national water financing policy so that we can get on with the job of completing projects where commitments have already been made and undertaking new construction starts to meet the country's future needs."

The President also spelled out his cost-sharing and financing policies for water projects, and stated, *inter alia*, that the costs of project planning are to be shared with project sponsors. Consistency in cost-sharing for individual project purposes is to be sought, so that all sponsors are treated consistently and fairly, but each water agency is to negotiate reasonable financing arrangements with the sponsors of each project. Ultimately, Congress and the President together will decide cost-sharing, financing and cost recovery arrangements.

The Assistant Secretary of the Army for Civil Works, who oversees the Corps of Engineers Civil Works program, has recommended specific cost-sharing and financing policies to the Office of Management and Budget.

Dialogue has begun at the action level, and there is genuine optimism for building a new intergovernmental partnership to break the water project funding logjam.

With respect to the sharing of planning costs, the Corps planning process has been divided into two phases. The policy proposes that the federal government will bear the full costs of an initial 12- to 18-month "reconnaissance" phase. Project sponsors would provide 50 percent of the cost of a follow-up two- to three-year "feasibility" study for those "reconnaissance" studies deemed "winners." Up to one-half of the non-federal cost may be services in kind.

With respect to project implementation, under Army policies, costshares for each project purpose are consistent among projects, and almost invariably exceed traditional costshares. Non-federal sponsors will provide their share during construction, rather than the traditional form of repayment with interest over the life of the project. We in the Army believe there should be set cost-sharing percentage formulas; however, there is a great deal of flexibility on individual, verifiable hardship cases for sponsors to extend their period of payment.

The Army recognizes that its proposed and currently voluntary cost-sharing agreements reached with sponsors would be superseded by water resources legislation. If a sponsor is not able to borrow at favorable interest rates, the Army will consider financing those outputs and require repayment at the Treasury rate. This rate is currently about 11 percent and should not be confused with the federal discount rate of 8-3/8 percent used in economic analyses of water projects. The Army is using these policies in negotiating voluntary agreements with non-federal project sponsors — with the explicit understanding that Congress will ultimately decide the cost-sharing issue.

More remains to be done to effect viable local, state and federal working partnerships.

A Light at the End of the Tunnel

The time is right for cost-sharing — financing can be found! The 1986 budget proposals submitted to OMB by Robert Dawson, acting assistant secretary of the Army for Civil Works, and subsequently included in the President's budget, contain a total of 29 project for which the Army has reached voluntary cost-sharing agreements with local sponsors. These projects include those for which the Assistant Secretary previously negotiated agreements in 1982, 1983 and 1984, as well as those negotiated by Corps field offices in 1985.

There is more good news. The Interstate Conference on Water Problems (ICWP), with the Corps, sponsored four regional financing workshops during the fall of 1984. Over 330 planners, engineers, financial consultants, investment bankers and government officials shared ideas, problems and success stories on water project financing. Topics included benefits and revenues, financing powers and limitations, financial planning, financial and economic analysis, creative financing techniques and financial implementation. Dialogue has begun at the action level, and there is genuine optimism for building a new intergovernmental partnership to break the water project funding logjam.

Challenges in Project Planning and Authorization

The sharing of planning costs, increased construction cost-sharing by sponsors and the participation of sponsors in financing during planning and construction will have significant impacts on the planning and authorization of Civil Works projects. The Corps has already made significant changes in internal planning guidance to accommodate such impacts, but more remains to be done to effect viable local, state and federal working partnerships. Faced with increased financial burdens and risks, project sponsors now fully expect that the planning and authorization process will yield cost-effective plans that meet minimum local requirements in a timely fashion. The Corps must adapt to this situation through pragmatic and flexible approaches to project planning and implementation. There are at least three major challenges:

1. Adapt the cost-shared planning process to allow greater sharing of planning tasks and a more specific focus on the needs of the sponsor and the financing community;
2. Address and alleviate non-federal concerns which differ from federal water development policy objectives;
3. Expedite review, administration approval and congressional authorization of feasible and financially sound project studies and projects.

The Corps must be willing to examine and adapt its planning practices.

Managing a Joint Planning Process

Management of a joint planning process requires adjustments in cost accounting and agreements on planning and engineering standards. Planning partners must agree upon the valuation of planning services provided by each and must determine the services to be credited to each sponsor's planning cost share. Services in kind to be considered include data collection, surveys, projections, computer modeling, public involvement, hydrologic and engineering studies, participation in plan formulation, social and community impacts and financial analysis.

Sharing responsibility for construction of joint federal/non-federal projects could also affect the planning process. Frequently, local sponsors request that they be authorized to initiate construction of certain project features prior to congressional authorization of the project—with these expenditures being credited to the required local cost-share of the project.

We need to take full advantage of the flexibility which is provided in the federal guidelines for water project planning.

There are a number of ways that this might affect planning. Most require the consideration of ways to fix agreements made at the end of the feasibility planning process in order not to initiate a replanning cycle. If staged construction increases total project costs and/or affects the economic justification of the last stage by increasing its costs, it will be necessary to adapt evaluation practices and financial arrangements to enable agreements to be made on the merits of the total project at the completion of feasibility planning. This will allow local sponsors to proceed with construction with assurance that the total project will be built when authorized. There will be many similar issues and challenges which will require a policy-making environment in which frequent evaluation and reassessment is the norm.

Another difficult issue to be resolved concerns the appropriate planning, environmental and engineering procedures to be applied. The Corps must be willing to examine and adapt its planning practices in such areas as environmental protection or mitigation, public involvement, interagency coordination and degree of acceptable risk. It is important that planning partners agree on the scope and scale of planning components and all costs. The Corps will increasingly be asked to trade off among project purposes, and to formulate plans which are soundly engineered and financially viable from a local perspective.

Because public officials must demonstrate to their constituents that studies generate results consistent with needs and expenditure, Corps planners must quickly provide a limited range of acceptable alternatives so that potential sponsors along with the financing community can evaluate possible financing alternatives. During the reconnaissance and feasibility phases of planning it is important to document the interjurisdictional effects of projects having widespread benefits as these will likely require the development of new institutional mechanisms.

During reconnaissance planning, the states and the Corps will be called upon for data and advice on how multiple local interests can equitably share the costs of feasibility planning. This step is critical in assuring that affected interests pay fair costs and receive appropriate consideration in planning decisions. Therefore, even though the reconnaissance planning phase is done at federal expense, a close working relationship demands the seeking out of potential sponsors to cost share the subsequent feasibility study.

The federal objective of water resources planning is to contribute to national economic development, consistent with laws and executive orders concerning the protection of the nation's environment.

During the feasibility phase, interjurisdictional considerations are equally important, as sponsors will be sought to share construction costs. This will require a detailed accounting of the benefit and cost distribution across geographic areas and over time. Although detailed accounting of benefit and cost incidence is difficult, it is important that this task begin early, as it is key to successful negotiation of joint planning and construction endeavors.

Addressing Non-Federal Concerns

To fully address non-federal concerns without inappropriate deviation from the federal water development objective, we need to take full advantage of the flexibility which is provided in the federal guidelines for water project planning — Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, March 10, 1983. These are commonly referred to as the Principles and Guidelines or simply the P&G.

The federal objective of water resources planning is to contribute to national economic development, consistent with laws and executive orders concerning the protection of the nation's environment. The P&G require each water resource development agency to develop a National Economic Development (NED) plan—that plan which maximizes national economic development benefits. A major concern of local sponsors is the ability to levy taxes or assess fees to project beneficiaries in order to obtain revenues to finance projects.

One of the major criticisms of current federal water development is the inordinate time period between the beginning of planning and the completion of construction of a project.

Planning studies typically address complex problem sets; they involve multiple needs, opportunities, project purposes and jurisdictions. Frequently the comprehensive plans formulated in this environment result in projects which are beyond the capability of local sponsors to finance — because of jurisdictional limitations, scale of projects or vendibility of outputs. Additionally, there may be real disagreements over the value of certain elements of "federal" plans — for instance, those that provide mitigation for valuable or scarce national resources which may be locally abundant.

The solution to this dilemma lies in the flexibility of the P&G — which state that each plan, including the NED plan, be formulated "in consideration of" four criteria: completeness, effectiveness, efficiency and acceptability. The acceptability criterion includes acceptance of a plan by state and local interests. An acceptable project may involve considering a smaller scale, shorter design life, staged development of separable increments, enhanced use of mixed-strategy plans incorporating nonstructural and demand management measures, reduced environmental mitigation, increased emphasis on outputs creating regional or local employment of tax gains and the substitution of recurrent costs for capital costs. Acceptability considerations may also raise the issue of lowering costs by modification of engineering and environmental procedures without significantly increasing risk where legally possible.

In effect, these criteria are constraints upon the range of feasible solutions. Therefore, the NED benefits should be maximized within these constraints. Consequently, the development and screening of plans could focus not only on net economic benefits and environmental effects, but also on acceptability to the non-federal sponsors and their ability to finance the projects.

Sponsors' concerns include: restrictions on debt, taxation limits, deficit spending, the obligation of future appropriations, the co-mingling of funds and scheduling of referenda of support planning and construction. Because of uncertainty in the outcome of feasibility planning as it impacts on these concerns, sponsor(s) may also need to consider temporary arrangements to alleviate financial constraints from the start of planning until the time when firm funding commitments for construction must be made. The information needs of sponsors when considering such arrangements will need to be anticipated as part of the planning process.

It is clear that the emerging new partnerships between federal, state and local governments in developing the nation's water resources provide the impetus and resolve for solving the significant challenges facing wise and needed water resources development.

The P&G also enable the Corps to develop alternatives to the NED plan in order to address other federal, state, local or international concerns which are not fully addressed in the NED plan. If it can be shown that the concerns which led to the development of an alternative to the NED plan provide an overriding reason for selecting that alternative, the Secretary of the Army may select that alternative for recommendation to Congress.

Streamlined Review and Authorization

A state or local unit of government committing funds to project planning must know that such expenditures will result in a quality project which can be built within a reasonable time. One of the major criticisms of current federal water development is the inordinate time period between the beginning of planning and the completion of construction of a project. This time period can easily extend to 20 years and results largely from lengthy reviews and sequential referrals to the Congress for authorizations and appropriations for each step of the planning, design and construction process. Adding the additional time to negotiate cost-sharing agreements with local sponsors can only lengthen an already unacceptably long process, unless a major revision of current practice occurs.

The Corps is committed to rethinking our procedures. Planning responsibilities and planning costs both must be shared.

Precedents exist for congressional recognition of the need for speedy review and authorization. Under Section 201 of the 1965 River and Harbor and Flood Control Act, projects under $15 million may be authorized by resolution of the House and Senate Public Works Committees rather than by enactment of specific project legislation. Also, under the Continuing Authorities program, the Chief of Engineers has the discretion to plan and construct small projects (for instance, less than $4 million federal costs for flood control and less than $2 million federal costs for navigation) without referring to Congress or the committees for approval. Finally, Congress has also authorized the Corps to continue planning and engineering for projects which have been submitted for authorization but not yet authorized, although this authority has limited application.

Other alternatives have been proposed to streamline the development process. These include resuming the use of Section 201 which was discontinued in 1978, expanding the dollar limits of the Continue Authorities program, providing for concurrent authorization of projects and appropriation of funds, authorizing the Corps to review and participate in implementation of plans developed by non-federal governments, much as in the fashion of the Soil Conservation Service, and providing for concurrent and shared review of plans by local, state and federal partners. Streamlined planning and construction is perhaps the most difficult and yet the most important issue to be faced if the new cost-sharing partnership is to succeed.

Meeting the Challenge

It is clear that the emerging new partnerships between federal, state and local governments in developing the nation's water resources provide the impetus and resolve for solving the significant challenges facing wise and needed water resources development. We believe that all partners are willing to critically examine existing relationships and methods for financing the planning and construction of needed water projects.

Together, as we establish closer working relationships, we will build a new and wiser consensus for meeting tomorrow's water needs.

The Corps is committed to rethinking our procedures. Planning responsibilites and planning costs both must be shared. We will more flexibly apply the standards and criteria which have evolved over the years. We will apply uniform cost-sharing formulas, but will assure equitable financing arrangements based upon need and ability to pay. We will continue to work closely with non-federal sponsors in finding ways to formulate the "right" project and to develop financing packages. These include critical analysis of criteria, provided an acceptable balance between risks and safety is maintained, and sizing projects to facilitate cost-sharing.

The Administration and Congress will need to work together to determine the exact cost-sharing percentages by project purposes. In the interim, the Corps will continue to adapt to changing times and through its decentralized organization will work closely with the units of government with which it shares water development responsibilities. Together, as we establish closer working relationships, we will build a new and wiser consensus for meeting tomorrow's water needs.

The authors gratefully acknowledge the assistance and the participation of the Institute for Water Resources staff. J. R. Hanchey, Director of the Institute, provided noteworthy insight, critique and assistance. Mark Mugler, Mark Sickles and Eugene Stakhiv deserve special thanks.

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The Evolution of a Regional Planning Organization

Muriel Morrisette
Staff Writer
Freshwater Society

When the federally supported river basin commissions were abolished by executive mandate after nine years, one of them chose to remain. It continues today as a balanced, influential "partnership among states," an example of how an organization with a regional perspective can promote wise management of a river basin.

The goal of the Association is to maintain a cooperative forum for member states and to assist states in the comprehensive, coordinated management of their water resources.

The Mississippi River is a much-used resource, and generations of Americans have depended on it for industry, transportation, power generation, recreation and — for some — drinking water. The Mississippi is divided into two systems, the Upper and Lower Mississippi. The Upper Mississippi covers a 189,000 square-mile watershed that stretches nearly 800 miles from the mouth of the Ohio River in southern Illinois almost to the Canadian border in Minnesota.

Efforts were made in the past to conserve water resources as the Upper Mississippi was being developed for use by commerce, industry and power generators. These efforts created an array of managers and policymakers at federal, state and local levels — a complex cast of characters which brought to light concerns about who was doing what and, ultimately, who was really "in charge of" the Mississippi River.

An Organization Is Established and Abolished . . .

By 1972 it had become clear that something had to be done, and the Upper Mississippi Basin Commission, a regional water planning organization, was created under federal funding by the Water Resources Planning Act of 1965. Minnesota, Wisconsin, Iowa, Illinois and Missouri were all represented on the Commission, as were all federal agencies with water resources responsibility.

The decision-making process is based on consensus, which ensures that policies and positions reflect the membership's diverse concerns.

This federally supported effort to coordinate concerns about the Upper Mississippi through a regional perspective lasted nine years. In 1981, the Upper Mississippi Basin Commission was abolished as part of a reassessment of the appropriate roles for federal, state and local governments in water resources management.

. . . and Established Again

The governors of the five Commission member states, recognizing the ongoing necessity for coordinated resource planning, signed a resolution recommending continuation of an interstate organization. The Commission was abolished, but it was replaced by the Upper Mississippi River Basin Association, formed in December 1981.

The governors of each of the five member states appointed a delegate to the Association. In 1982 the Association extended advisory membership to appropriate federal departments, including Agriculture, Army, Interior, Transportation and the U.S. Environmental Protection Agency.

The goal of the Association is to maintain a cooperative forum for member states and to assist states in the comprehensive, coordinated management of their water resources. Specifically, the Association strives to 1) address regional conflicts in the basin; 2) serve as a regional coordinating body for federal, state, interstate and local management plans; and 3) unify state positions on water and related land issues.

A "Partnership Among States"

Whereas the former basin commission was primarily a regional planning organization, the Upper Mississippi River Basin Association has taken a somewhat broader stance, providing a partnership among the states and facilitating a dialogue and information exchange on technical and policy issues. Through the development and adoption of position statements, the states articulate their mutual concerns collectively and promote common perspectives.

The decision-making process is based on consensus, which ensures that policies and positions reflect the membership's diverse concerns. In this way, the Association provides an effective regional influence on policies eventually formulated in Washington.

The Association is neither an environmental group nor an energy group nor a commerce and industry group: It is all of these things.

The major focus of the Association's efforts to date has been implementation of the Comprehensive Master Plan for the Management of the Upper Mississippi River System. This plan was prepared by the former Commission, and the Association is committed to its support. To that end, the Association provides information to private citizens, resource managers and Congress, and advocates the necessary congressional authorization and appropriations to initiate recommended programs.

Not content to wait for Congress to take the initiative in solving the basin's problems, the Association has already begun working with the states on those proposals of the master plan that can be implemented on a state or regional level. Association task forces have conducted analyses of problems and needs on such subjects as soil erosion and recreational facilities.

Other activities of the Association include a yearly analysis of the federal budget which summarizes proposals related to water; workshops and conferences that bring together people with specific expertise or perspectives; and maintenance of an extensive library and map file.

The Association is replacing shortsighted planning with a far-sighted plan of action.

Association Attributes: Influence, Balance . . .

The Association boasts two attributes that give it more than just a fighting chance for success. The first is influence. The Association functions as an extension of the executive offices of five state governors. This gives Association recommendations a direct line to those who can act on them.

The second is balance. The Association is neither an environmental group nor an energy group nor a commerce and industry group: It is all of these things. It is this critical balance the Association seeks by encouraging management beneficial to all who depend on and enjoy the Mississippi — the eagles and the engineers, the petroleum industry and the poets.

. . . and a Far-Sighted Plan of Action

The Upper Mississippi River Basin Association has made considerable progress in its first four years. In vigorously promoting wise, multi-purpose management of the basin and providing its member states with a unique opportunity to plan together for the future, the Association is replacing shortsighted planning with a far-sighted plan of action.

Muriel Morrisette is a staff writer for the Freshwater Society.

PART II:

A State Perspective

> Reaching our goals will require a new federal-state relationship which focuses not on direct financing but on fostering self-sufficiency in financing.
>
> Joan M. Kovalic
> Taft, Stettinius & Hollister

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State Solutions to Water Problems: Smaller-Scale and Site-Specific

Joan Warren
Office of Solid Waste
U.S. Environmental Protection Agency

The shift of responsibility for water management from the federal government to the states may lead to smaller-scale — and more cost-effective — responses to water problems across the nation.

Reagan Administration policies, combined with changing water issues, have brought to Washington a new philosophy about the role of the federal government in water management. Previous administrations, both Republican and Democratic, sought an active management and financial role for the federal government: through construction of multi-purpose water resources development projects and wastewater treatment facilities, the planning and coordinating activities of the Water Resources Council and the River Basin Commissions, state grants for water resource planning and the research activities of the Office of Water Research and Technology.

Significant Reductions in Federal Participation

With the exception of funding for the Bureau of Reclamation, the current administration has significantly reduced or eliminated all of these activities. Annual federal expenditures for water projects, including navigation and port development, have decreased from approximately $5.5 billion in 1960 to approximately $4 billion in 1984.

The federal role in protecting water quality increased greatly with the enactment of the Federal Water Pollution Control Act Amendments of 1972. The Act established not only a new federal regulatory program, which would be eventually turned over to the states to manage, but also authorized a massive funding program for the construction of wastewater treatment facilities. Program funding levels reached a high of $5.5 billion per year in 1976 and 1977, with federal appropriations dropping to $2.4 billion annually in 1982 through 1985. This has been in addition to a reduction of the 75 percent federal share for project costs to 55 percent beginning to 1985.

Annual federal expenditures for water projects have decreased from approximately $5.5 billion in 1960 to approximately $4 billion in 1984.

Finally, the National Water Resources Council has been abolished. While many regarded the Council as ineffective, it was an easily identifiable source of information on federal water activities. No such source now exists; information must be obtained from the myriad of federal agencies with some responsibility for federal water activities.

Responding to Increased Responsibilities

In addition, the nature of emerging water issues has increased the responsibilities of the various regions, and the state and local governments. By 1982 most of the major water development projects had been completed. The 1983 ***National Water Summary*** concluded that "...the best reservoir sites have been put to use, and new reservoir development is likely to be less cost-effective than that which has occurred in the past."

Funding, however, is still needed not only for new construction but also for rehabilitation of our nation's water "infrastructure." State and local governments are undertaking smaller-scale projects that can be financed and completed expeditiously at these levels of government with the assistance of private beneficiaries.

According to a recent study by the Congressional Budget Office, states began to utilize a variety of different financing techniques in 1981 and 1982 which were independent of federal expenditures. These included: direct appropriations (36 states), general obligation or "GO" bonds (23), revenue bonds (11), dedicated taxes (28), and revolving or special funds (27).

Some examples are:

- Pennsylvania: $300 million special loan fund for public water supply;
- Texas: $600 million revolving loan fund for water supply and wastewater treatment;
- Massachusetts: $60 million GO bond for water supply leak detection and rehabilitation—$260 million GO bond for water-related construction;
- California: $1.75 billion in GO bonds for water activities (total to date);
- New Jersey: $1 billion in GO bonds since 1969 for water-related activities;
- Florida: $75+ million annually from ad valorem taxes levied by water management districts.

State Regulatory Programs

In terms of water quality, U.S. Geological Survey data have shown little change over the past few years. Major degradation of the nation's water bodies has been halted, in spite of increasing population and industrial activity. Both surface and groundwater quality continues, however, to be affected by pollutants from nonpoint sources, runoff from forest, agricultural and urban lands.

Controlling nonpoint source pollution is a complex, costly and politically difficult task, because it involves changing land use patterns.

Controlling nonpoint source pollution is a complex, costly and politically difficult task, because it involves changing land use patterns. The controls or best management practices (BMPs) must be site-specific, and the results are very difficult to measure. The program costs are potentially very large and, in many cases, must be borne by those who do not perceive the benefits. It would be virtually impossible to design a federal regulatory program for controlling nonpoint sources.

Many states have established their own control programs, with varying degrees of success. Such programs include education and training in addition to financial incentives, such as low-interest loans, tax incentives and cost-hiring. One of the best examples may be Wisconsin's program, which provides cost-sharing and local assistance funds for priority watershed projects selected by state and local representatives. The funds cover 50 to 70 percent of the costs for each BMP. There are 19 projects now under way, typically taking eight to nine years to complete. A preliminary evaluation of the results of two priority watershed projects has been completed five years after the projects were begun in 1979.

The federal government is the most appropriate vehicle to undertake basic water research and to set minimum national water quality standards to ensure consistency across states.

Groundwater: Effective Non-Federal Approaches

Finally, another issue that demonstrates the changes in water management responsibilities is that of groundwater protection and depletion. Notwithstanding recent federal court decisions that have found groundwater to be an article of interstate commerce, management of groundwater logically lends itself to regional, state and local approaches. The varying hydrological conditions, geological nature of the aquifers, and the historical and legal traditions argue against a federal system of controls.

In 1973 the National Water Commission report recommended "greater utilization of the compact approach for dealing with regional water problems other than through federally directed and dominated programs." The Delaware River Basin and Susquehanna River Basin Compacts already provide for broad planning, licensing, regulatory and project construction powers at an interstate level. The Western states are currently examining the use of interstate compacts in managing groundwater depletion.

Perhaps the best known example of state groundwater management is the Arizona program. It calls for an inventory of groundwater, establishment of active management areas, conservation plans for all water users, and eventual purchase and retirement of farmlands. The cost will be recovered, in part, from groundwater withdrawal fees.

New Jersey and Florida have adopted state groundwater quality standards. Some states are considering classifying their groundwater aquifers to provide guidance on the allowable uses of lands above the aquifers.

A Reduced—But Definite—Federal Role

The growing trend is to move in the direction away from federal water management. This does not mean, however, that the federal role is no longer needed. The federal government is the most appropriate vehicle to undertake, for example, basic water research — whether on monitoring and control technologies or the fate of toxic pollutants in groundwaters — and to set minimum national water quality standards to ensure consistency across states. At the same time, the complex and regional nature of water issues, the current federal philosophy regarding water management, and the federal budgetary problems all point to a new era for water management. It will be guided by smaller-scale and more cost-effective solutions for the nation's water problems.

A new era for water management will be guided by smaller-scale and more cost-effective solutions for the nation's water problems.

About the author: As staff to the U.S. EPA's Office of Solid Waste in Washington, D.C., Joan Warren's responsibilities include public outreach and community involvement in the national hazardous waste management program. For over four years, she covered water-related and environmental issues for the National Governors' Association. She also served previously as staff director for natural resources at the National Conference of State Legislatures.

The ICWP: A Federal/State Partnership

Joan M. Kovalic
Executive Director and General Counsel
Interstate Conference on Water Problems

While the federal government has an important role in defining and reflecting the national interest, the states are primarily responsible for managing all our nation's water resources—both quality and quantity—and for defining water rights.

Protection and enhancement of the national interest must rise from a true partnership of federal and state activities in water. National water policy and effective water management must evolve from this partnership for action.

The Interstate Conference on Water Problems (ICWP) is the national association of state and regional water officials. Its purpose is to facilitate cooperation, consultation and exchange of information among state, intrastate and interstate officials and agencies.

ICWP's areas of concern include: conservation, use, development and administration of water and related land resources; the laws governing these matters; and federal-state relationships. To the extent feasible and desirable, ICWP seeks to promote a consensus of views and to present such views to the Congress and federal agencies.

Protection and enhancement of the national interest must rise from a true partnership of federal and state activities in water.

The members of ICWP are truly water policymakers, concerned with managing and developing water as a total resource, incorporating both quantity and quality concerns. ICWP seeks to provide guidance gathered from the experience of state, interstate and intrastate water officials on the major water issues confronting the nation.

As the only national organization of state and regional water officials which has as its concern all water problems—both quantity and quality-related issues—ICWP is a unique forum for identifying critical issues, arriving at a consensus and working with key policymakers through the National Governors' Association, federal agencies and the Congress. In an effort to broaden the forum for exchange, ICWP has created an affiliate membership category for individuals, "for-profit" businesses and other water-related entities.

States as Water Managers: Increased Control, Expanded Responsibility

An interview with Larry Morandi
Program Manager, Natural Resources
National Conference of State Legislatures

As federal and state roles in water management begin to be reassessed and restructured, states are responding to their increased responsibilities with new initiatives in the areas of funding, management and preventive action. As program manager of natural resources for the National Conference of State Legislatures, Larry Morandi has managed numerous water and land resource projects. In this interview he shares examples of some of the initiatives states are undertaking.

Q: What is the basis for the expanding role of the states in terms of water management?

A: The federal government is limiting its role in the water management business — both quantity and quality management. It simply doesn't have the money anymore, and it has begun to recognize the capacity of states to manage their water resources.

An example of this trend is the Environmental Protection Agency (EPA) groundwater strategy, which has focused on the states' role. The states have been developing groundwater quality programs because they recognize the problem and have not been willing to wait for federal action.

States are being asked to be financially responsible.

Q: Is this shift of major responsibility to the states a positive one?

A: In the case of groundwater, it probably couldn't be any other way. The federal government couldn't have taken a major role even if they'd wanted to. Cleaning up surface water is one thing—the sources of contamination are often clear and well-defined, and they cross state boundaries. Groundwater, however, is another story. Solutions to groundwater quality concerns depend on altering land-use activities, and land-use policy has historically been viewed as a state and local issue, not a federal one.

Q: Are there positive implications in this movement toward decentralization of water management structures?

A: Yes, there are a number of implications. For one, historically the EPA would give money directly to a particular local government. Now, that money is being funneled through the state, allowing the state to determine and set priorities. States are being asked to be financially responsible. They are taking on a long-term planning posture and looking at concerns on a statewide basis.

States and local governments can respond more efficiently and effectively to site-specific problems than the federal government can.

The states are also brokering money and involving state money in some of these efforts. This approach is giving states control and at the same time forcing them to become more responsible.

States and local governments can respond more efficiently and effectively to site-specific problems than the federal government can. They can also be more flexible, and they can set up incentives to encourage cooperative interaction.

Q: What are some of the negative implications of this movement in the direction of non-federal management?

A: In some parts of the country, sufficient revenues are not available at the state or local level. When the federal government pulls out of waste treatment efforts, for example, there may be cutbacks in design and implementation. States in a difficult financial stance will be in a difficult position.

Aside from federal-state relationships, there are other problems with states managing water on their own. California is one example. Southern California believes it needs more water. Northern California disagrees, believing instead that there's too much waste occurring and that conservation could make up the supposed deficit. The Peripheral Canal, which would have sent water from Northern California down to Southern California, was defeated resoundingly by a 2-to-1 margin.

The disagreement is over the question "Can conservation save enough water to not have to develop new water?" Northern California and environmentalists say yes, and Southern California says no. Here's a case where federal money and federal-state relationships are definitely not the issue. It's a political situation within the state itself.

Independent financing mechanisms may allow states to plan more effectively for comprehensive water resource development.

Q: What kinds of initiatives are states taking in the face of reduced federal assistance?

A: A number of states have taken it upon themselves to develop water programs that neither require nor desire federal assistance or directives. State authorities are beginning to assist local governments in financing water supply and waste treatment facilities—projects which were in the past heavily federally subsidized. Such independent financing mechanisms may allow states to plan more effectively for comprehensive water resource development.

Q: How are states responding to the lack of federal groundwater quality regulations?

A: The lack of federal regulations to protect groundwater from a wide range of hazardous contaminants was one impetus for legislation enacted in New Jersey. The new law requires all public community water systems to test for the existence and excessive levels of hazardous contaminants in underground drinking water supplies. The Department of Environmental Protection must adopt maximum contaminant levels for 22 specific organic compounds based on recommendations from the state's newly created Drinking Water Quality Institute.

It's an attempt to get clean water on-line quickly without lengthy up-front legal delays.

The costs of the tests and any cleanup requirements will be passed on to consumers of each system, in the form of increased water rates approved by the state's Board of Public Utilities and increased municipal budgets to defray the expense of employing treatment techniques or developing alternative drinking water sources.

Q: Have states begun to develop statewide groundwater quality programs?

A: Wisconsin has adopted perhaps the most comprehensive state groundwater quality protection program to date. Two aspects of this program set it apart from others.

Local input is encouraged in this cooperative effort.

First of all, the Wisconsin Department of Natural Resources (DNR) is required to adopt two sets of groundwater quality standards—while other states have only one set.

The first level of standards is an enforcement standard, based on maximum permissible levels of contaminants. If this enforcement standard is exceeded, a violation occurs and a compliance action is sought. This enforcement standard is the one that other states have.

More important than this enforcement standard, however, is Wisconsin's second set of standards—the preventive action limit. This preventive action limit serves as a sort of "early warning device."

For example, the enforcement standard for a particular contaminant may be 10 ppm (parts per million), but the preventive action limit may be 1 ppm. When a level of 1 ppm is reached, it's time to get to work on a prevention plan — to take action **before** the enforcement level is reached or exceeded.

The second unique aspect of Wisconsin's program is its no-fault compensation fund for well owners with contaminated water. Unless the contamination is proven to have been caused by malice or an illegal act, the well owner submits costs for a new water supply to the DNR for review, and the costs are paid from state appropriations. It's an attempt to get clean water on-line quickly without lengthy up-front legal delays.

Another good example of a state recognizing the interrelationship between water resources and land management is found in New York. Furthermore, it's a good example of a state program with local level cooperation and input.

The sole source of drinking water for three million people on Long Island is an aquifer. Recognizing the need for political accountability in land use decisions, a state commission is seeking to protect the aquifer by working closely with local government to implement effective and responsible land use strategies, such as reduced density zoning, mandatory clustering of housing, transfer of development rights, and landfill prohibitions. Local input is encouraged in this cooperative effort.

States will be using federal dollars increasingly as seed money to set up revolving funds, to be loaned at low interest, for ongoing long-term use.

Q: What trends in water management will develop over the next 10 years?

A: On the quantitive side, the big federal appropriations for Western dams are over. There's not much new water to be developed. States are looking to saving and reallocating water rather than finding new water.

The federal government will continue to play a role in water quality management, because certain federal standards must continue to be met. Federal agencies will periodically review state standards and, if necessary, force compliance.

Management and preventive action may replace construction and abatement as more cost-effective means to achieve water resource goals.

Federal grants for construction of waste treatment facilities may be phased out over the next 10 years. In anticipation of this movement, states will be using federal dollars increasingly as seed money to set up revolving funds, to be loaned at low interest, for ongoing long-term use.

States are already beginning to be forced to "get their houses in order" in the face of such considerations as large-scale water diversions. In the Great Lakes region, for example, they're working to prove their use of and need for Great Lakes water. Before now, they've known little about the specifics of their uses and needs. But the diversion issue is forcing them to be prepared to defend their need for their own water.

The next 10 years will see states expanding their roles as water managers in response to decreased federal directives and financial assistance. Management and preventive action may replace construction and abatement as more cost-effective means to achieve water resource goals. Increased state and local financing will lead to increased state control of—and responsibility for—the management of our nation's water resources.

Larry Morandi was interviewed by Linda Schroeder, editor.

Western Management Innovations

The ability of the Western states to accommodate changes in water use is being demonstrated on a daily basis. These approaches will expand and multiply as the states continue to improve their ability to manage their own water resources.

- Alaska and Wyoming have developed bold new approaches for state financing of water projects.
- In Arizona, Governor Babbitt, witnessing increased competition for water among cities, farmers and miners, led negotiations which resulted in Arizona's Groundwater Management Act, the most comprehensive groundwater code in the nation.
- California has one of the most advanced water conservation programs in the nation.
- Governor Lamm of Colorado, tired of perennial disputes over water between the eastern and western slopes, instituted the Metropolitan Water Roundtable, which is negotiating a series of key trade-offs.
- Hawaii is testing a process for purifying impaired-quality groundwater after it has been pumped.
- In Idaho, Governor Evans has encouraged the Department of Water Resources to develop a number of innovative financing mechanisms to implement the state's water plan.
- Montana has established a Reserved Water Rights Compact Commission to address the state's Indian and other water rights disputes.
- Nebraska, in cooperation with neighboring High Plains states, is developing common strategies for protecting the Ogallala Aquifer.
- Nevada has enacted a comprehensive groundwater law which assures protection of existing rights while allowing reasonable use for new demands within the limitations of water quantities available.
- New Mexico is taking the lead in studying ways a state can preserve its groundwater, ranging from federal legislation to state appropriation of unappropriated groundwater.
- North Dakota has undertaken an extensive wetlands and wildlife enhancement program as part of the Garrison Project.
- Oregon, Texas and Utah have active and effective loan programs to assist local governments in water development projects.
- In South Dakota, Governor Janklow agreed to sell Missouri River water for a coal slurry pipeline in order to raise revenues to finance water development so that the state could capture some benefit from its unused water rights. Although, for economic reasons, the pipeline project is no longer being considered, its benefits would have included construction by the slurry pipeline company of a water pipeline to deliver water to western communities in the state.
- Washington, in its Yakima River Basin Enhancement Project, is tapping experts nationwide to develop non-structural conservation measures.

These approaches will expand and multiply as the states continue to improve their ability to manage their own water resources.

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The Arizona Groundwater Code: A Model of Strength in Compromise

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Arizona is one of the fastest-growing states in the nation. Mostly desert, it is also highly dependent on groundwater, and its future development depends on wise management of a limited water supply. Arizona has developed what is considered to be the most comprehensive state management system to date for groundwater. This long-range plan for reaching and maintaining a balance between water supply and water demand in Arizona may serve as a model for other states as they begin to prepare their own plans for state-based groundwater management.

On June 11, 1980, the Arizona Legislature passed the Groundwater Management Act. The next day, Governor Bruce Babbitt signed the Act into law, calling it "a statement by the legislature, the mines, cities and agriculture, saying 'We will put the common good above special interests.'" The state's daily newspapers heralded the new law in front-page headlines and glowing editorials. Even the ***New York Times*** commented on the Act: "In a state where talk about regulating water use can be as unpopular as talk about gun registration, one of the nation's most far-reaching laws for managing groundwater has gone into effect."

The Act made the first significant changes in the state's groundwater laws in 32 years. The bulk of the Act was a comprehensive new groundwater code that is unique in the United States in its ambitious approach to groundwater management. How did Arizona, a notably conservative state, come to pass this pioneering law? The answer lies in the magnitude of Arizona's water problems and the development of the political will to manage this critical resource.

The Code has two primary goals. The first is to control the severe overdraft of groundwater currently taking place in many parts of Arizona. The second is to provide a means of allocation for the state's limited groundwater resources to most effectively meet the changing needs of the state.

The Consumption/Supply Imbalance

Arizona's major water problem is the imbalance between the water consumed and the dependable supply. Averaging less than 10 inches of rainfall per year, Arizona relies on groundwater for over 60 percent of its water supply. Agriculture has historically pumped vast quantities of groundwater, and the state's rapid population growth in recent years has required increasing amounts of groundwater for municipal and industrial purposes.

According to the 1980 census, Phoenix is now the ninth largest city in the country, while the population of the metropolitan Tucson area is nearly 490,000. To keep pace with expanding water uses, Arizonans annually consume approximately 2.5 million more acre-feet of groundwater than is replenished by nature. In Maricopa County where the city of Phoenix is located, depletion of groundwater is ***over 30 times the rate of natural recharge***. The city of Tucson, which is totally dependent on groundwater, is located in Pima County, where uses of groundwater are nearly five times greater than natural recharge.

Since it took thousands of years for this groundwater to accumulate, continued pumping at current rates threatens the availability of water for future generations. Excessive groundwater pumping also contributes to land subsidence and water quality degradation and causes costly disputes among groundwater users.

The Central Arizona Project (CAP), a federal reclamation project designed to bring Arizona's remaining entitlement of Colorado River water to central Arizona, will help to resolve these problems, but it will not be a panacea. In the three central Arizona counties which will receive CAP water, the estimated annual overdraft is 1.8 million acre-feet. The estimated long-term CAP water supply will be 1.2 million acre-feet per year, or only two-thirds of the current rate of overdraft.

A "Formidable Mandate"

In 1977, the Arizona Legislature established the Groundwater Management Study Commission to recommend a comprehensive groundwater management code. Unlike previous study commissions, this commission was composed of legislators and representatives of the major water users. Many of the representatives were powerful lobbyists who, seeking to right inequities, had no intention of sitting on a commission which either failed to carry out its responsibility or developed recommendations which were politically unacceptable.

Even so, the Commission's mandate was formidable, given the Commission's size, its diverse make-up and the complexity of its task. Consequently, for the first year of its existence, the Commission held a series of workshops designed to educate both commissioners and the general public. It then spent an additional six months developing and agreeing upon a decision-making process.

By the year 2025, groundwater withdrawals may not exceed recharge.

Because of the diverse make-up of the Commission, it was necessary to develop a process in which each competing water-using interest felt its views were being fairly considered, while working toward consensus on one set of policies. It was recognized by many that if any one interest brought its own draft of legislation to the "bargaining table," this would cause a chain reaction of partisan drafts which could polarize the Commission and make it difficult to mesh the drafts into a "Commission bill." It should be noted that throughout the many months of serious wrestling with issues and disagreement between interest groups on the Commission, this occurrence, which might have seriously set back the decision-making process, was successfully avoided.

After trial and error, the Commission agreed upon a decision-making document, which set forth several alternatives to various elements of a comprehensive groundwater management code, incorporating the different positions of the members of the Commission.

In May 1979, the Commission convened at a secluded conference center to begin decision-making in earnest. The decisions agreed upon formed the basis of the Commission's ***Draft Report of Tentative Recommendations***, publish in July 1979. Two members of the Commission appointed by the governor to represent agriculture bitterly denounced the Commission's decisions and filed a minority report.

Considerable opportunities for conservation exist in Arizona.

The Commission then held public hearings on the draft report in eight cities. At each hearing, agricultural users turned out in full force to express their opposition. After the hearings, several Commission members expressed their desire to develop final recommendations that all major water users could support.

An added and very significant impetus for achieving a consensus was a warning from then-Interior Secretary Cecil Andrus, who informed state leaders that the Central Arizona Project, now a municipal, industrial and agricultural project, would be in jeopardy if the state did not enact meaningful groundwater reforms by the summer of 1980.

Fearing that only a bill which had the combined support of municipal, mining and agricultural interests could be enacted by the summer, representatives of these interests began informal negotiations aimed at reconciling their differences. Under the personal chairmanship of Governor Bruce Babbitt, the negotiations continued for six months and resulted in a draft groundwater code. The proposed legislation was then approved by the Commission. In a one-day special session, the Arizona Legislature adopted the bill recommended by the Commission without amendment, and the Groundwater Management Act of 1980 was signed into law by Governor Babbitt the following day.

Provisions of the Groundwater Code

The Code has two primary goals. The first is to control the severe overdraft of groundwater currently taking place in many parts of Arizona. The second is to provide a means of allocation for the state's limited groundwater resources to most effectively meet the changing needs of the state.

To carry out the goals of the Code, the legislature established a new state agency, the Department of Water Resources (DWR), which administers all state water laws except those directly regulating water quality. The director of water resources, appointed by the governor, is responsible for all decisions under the Code.

Because groundwater problems are not uniform statewide, the Code established geographical areas known as Active Management Areas (AMAs), within which intensive management of groundwater is required. This management area concept is ideal for a state like Arizona, where population and water supplies differ greatly from one area to another.

To reduce groundwater withdrawals, the Code mandates that the director of water resources develop a series of five management plans for each AMA. The statutory management goal for the three urban AMAs — Phoenix, Tucson and Prescott — is **safe-yield**. This means that, by the year 2025, groundwater withdrawals may not exceed recharge. In the Pinal AMA, where a primarily agricultural economy exists, the goal is to extend the life of that economy as long as feasible, consistent with the need to preserve future water supplies for non-agricultural uses.

Tucson reduced its water consumption rate by nearly 20 percent in five years.

In each management plan, the director must establish conservation requirements for all groundwater users to achieve reductions in withdrawals. For farmers, the director will establish a water duty, which is the per-acre amount of water it is reasonable to apply in order to grow the crops historically grown.

In calculating the water duties for the first management period, the director must assume that each farmer will implement conservation methods which would be reasonable for the farm unit, such as lined ditches, pump-back systems, land leveling and efficient application practices. In subsequent management periods, the director must assume farmers will implement more sophisticated conservation methods such as converting from flood to drip irrigation.

For municipal users, the director will require reasonable reductions in per capita consumption and other appropriate conservation measures such as limitations on ornamental lakes and landscaping. For industrial users, the director will require use of the latest commercially available conservation technology.

In each successive management plan, the conservation requirements will become more stringent. Additionally, after the first management period (1983-1990), the director may develop programs to augment the water supply through watershed management, artificial recharge and other feasible means.

Opportunities To Conserve

Considerable opportunities for conservation exist in Arizona. The average visitor to Phoenix is often amazed to find lush green lawns and citrus trees instead of the expected Sonoran desert vegetation. Unlike Tucson, the Salt River Valley, where Phoenix is located, has enjoyed the benefits of substantial amounts of surface water.

The average water use for the city of Phoenix in 1981 was 267 gallons per person per day, compared with Albuquerque (242 gallons), Denver (215 gallons), and Los Angeles (172 gallons). A more startling comparison is with the city of Tucson, which uses approximately 159 gallons per person per day. Tucson achieved remarkable reductions in water use through a program aimed not at water conservation but at reducing peak hour usage. Through its "Beat the Peak" program, Tucson reduced its water consumption rate by nearly 20 percent in five years. It is not unreasonable to assume, therefore, that similar reductions can be achieved by Phoenix and other cities in the Salt River Valley.

Before a person may offer subdivided land for sale, he must demonstrate to the DWR that there is sufficient water of adequate quality to meet the needs of the proposed development for at least 100 years.

Several valley areas can achieve even greater conservation. Paradise Valley, for example, served primarily by a private water company, uses approximately 984 gallons per person per day. Even though this high amount is attributable partly to the substantial number of resorts and golf courses in Paradise Valley, the per capita use rate is alarmingly high.

Although municipal conservation is clearly an idea whose time has come in Arizona, the biggest water savings through conservation can be achieved by agriculture, which in Arizona consumes approximately 89 percent of the water used. If agricultural use of water in the Phoenix AMA is reduced by 15 percent, approximately 330,000 fewer acre-feet of groundwater will be withdrawn each year.

Like conservation, the requirement that water users measure their withdrawals is long overdue.

"Assured Water Supply"

The Code prohibits new urban development where an "assured water supply" does not exist. Before a person may offer subdivided land for sale, he must demonstrate to the DWR that there is sufficient water of adequate quality to meet the needs of the proposed development for at least 100 years.

This provision is one of the most controversial and most important, since it prevents developments from springing up in water-short areas and also protects innocent home buyers. Although developers often grumble about the requirement of demonstrating a 100-year supply, no serious attempt has been made to weaken this provision.

The DWR has processed hundreds of applications for certificates of assured water supply and has issued many certificates. Interestingly, most developers who have been unable to demonstrate an assured water supply have not pressed for a formal denial of their applications, and no one has yet appealed a decision in this area to a superior court.

Measuring Groundwater Withdrawals. . .

Like conservation, the requirement that water users measure their withdrawals is long overdue. Arizona simply cannot manage its groundwater resources if it does not know how much groundwater is being withdrawn each year. With limited exceptions, all persons withdrawing groundwater in an AMA from a well with a pump capacity in excess of 35 gallons per minute must use a water measuring device approved by the director. After these devices are in use, the Code requires the director to levy and collect a groundwater withdrawal fee, not to exceed five dollars per acre-foot, to help defray the costs of groundwater management.

Many water users long resisted requirements to "meter" their wells. As the Groundwater Management Study Commission observed, "metering of groundwater use has been an emotional issue in the past and has been opposed primarily by agricultural users who fear the costs associated with metering and the imposition of pump taxes after meters are required." With this in mind, the Commission recommended and the legislature agreed that a range of devices approved by the director could be used to measure withdrawals. The range of devices allowed may make the Department's enforcement efforts more difficult, but it may also encourage more water users to comply with this aspect of the law.

Those who use groundwater should share in the cost of managing that resource.

. . . and "Sharing Costs" Through Taxes

When the concept of a "pump tax" was first considered by the Commission, it was not out of extreme foresight. The Commission was not concerned with the economic woes which might befall the state, but rather with the belief that those who use groundwater should share in the cost of managing that resource.

In retrospect, the inclusion of a groundwater withdrawal fee may prove invaluable by generating the necessary funds to keep the Code on track. Additionally, although the fee is designed primarily to help defray the costs of management rather than to reduce groundwater withdrawals, it may give some water users a further incentive to conserve water and serve as a reminder to larger water users of the need for better management of their withdrawals.

Constitutional Challenges

One of the most novel provisions of the Groundwater Management Act of 1980 is its nonseverability clause, which states that if any portion of the Act is declared unconstitutional, the entire Act will be null and void. This provision emphasizes the delicate nature of the compromises made by the negotiators and their desire to see the losses and gains of all water users stand or fall as a whole.

Because of this clause, constitutional challenges to the Code were quick in coming. To date, the DWR has had unqualified success in defending the Code against challenges to its constitutionality. Considering the nonseverability clause, nothing less than unqualified success would suffice.

The Success of Arizona's Process

During the severe drought in California in 1976-1977, Governor Jerry Brown decided that California's water laws were in need of revision. He appointed a blue ribbon panel to evaluate proposals for modifying the state's water laws and to recommend needed legislation. The panel met for a year and one-half, considered the excellent papers written by a very capable staff, held public hearings and, finally, recommended new laws which were not, by any stretch of the imagination, radical. Yet the California Legislature virtually ignored the work of the Commission.

The composition of Arizona's Groundwater Management Study Commission differed markedly from the California panel. The Commission consisted of 14 legislators and 11 members appointed by the governor to represent major water users and the general public. In appointing the legislative members, a balance was sought between rural and urban legislators and among those known to be sympathetic to municipal, mining and agricultural concerns. The Commission's enabling legislation dictated that the governor's appointees include two representatives for mining, two for agriculture and two for cities. Many appointees were well-recognized spokespersons for their respective interest groups with considerable clout in the legislature.

A groundwater withdrawal fee may give some water users a further incentive to conserve water.

Although this composition promised a contentious atmosphere, it also reflected the fundamentally political nature of the task of writing a new groundwater law. It ensured that if the Commission were successful in developing recommendations—and many skeptics were placing odds against success—the legislature would enact those recommendations into law.

Each state must develop an approach which meets its own needs. This is one of the major reasons why the responsibility for groundwater management lies more appropriately at the state rather than the national level.

The Act establishing the Commission also contained a novel and arguably unconstitutional provision. It declared that, if the legislature failed to enact a new code by September 1981, the code recommended by the Commission would automatically become law. The provision was included to "hold the legislature's feet to the fire" and ensure that the work of the Commission would not go unheeded. Although the provision was challenged in 1978, the Arizona Supreme Court declined to rule on its constitutionality, saying that no injury had resulted from the challenged provision since the deadline for legislative action had not passed.

Much has been made of Secretary Andrus' threat that the CAP would be jeopardized if Arizona did not enact a new groundwater code during 1980. Clearly it was a factor that motivated the negotiators to reach a timely compromise. However, by October 1979, the Commission had been meeting for almost two years. It had studied virtually every aspect of groundwater management, met at nearly 50 public meetings, made tentative recommendations on a new code and held extensive public hearings on those recommendations. In short, a great deal of time and effort had already been invested prior to Mr. Andrus' pronouncement, and a commitment to developing a comprehensive code had formed.

A Model for Other States

As states evaluate their laws governing groundwater with a view toward better management of this resource, they rightly turn to the experience of other states for guidance. The Commission's experiences and work can indeed serve as a useful model for other states attempting to grapple with severe water problems, and Arizona's Code contains several features which have general applicability or which could be modified to meet another state's somewhat different situation.

In the final analysis, however, each state must find its own path. Too frequently discussion centers on doctrines for water allocation — such as prior appropriation, reasonable use and correlative rights—rather than on the development of laws which fit the unique factual and political circumstances of a particular state. Arizona has developed an "Arizona doctrine" for managing groundwater. Each state must develop an approach which meets its own needs. This is one of the major reasons why the responsibility for groundwater management lies more appropriately at the state rather than the national level.

While no interest group is completely satisfied with the Code, most groups are willing to live with the Code's restrictions rather than risk losing the benefits received.

Compromise Strengthens the Code

Once the Arizona Legislature decided to finally come to grips with the state's groundwater problems, it took two and one-half years of study by a special commission and six months of negotiations by representatives of the state's major water users to produce a draft code. The compromises necessary to the creation of the Code form a strong underpinning, ensuring the Code's longevity and protecting it from amendments that would strip the state of much-needed authority to manage groundwater.

While no interest group is completely satisfied with the Code, most groups are willing to live with the Code's restrictions rather than risk losing the benefits received. Consequently, the new Arizona Groundwater Code, an innovative and responsible step forward in Arizona's efforts to protect its most vital natural resource, appears to be on solid footing for years to come.

About the author: Kathleen Ferris advises the director of the Department of Water Resources in interpreting the Arizona Water Code, represents the Department in litigation and legislative hearings and supervises the Department's legal staff. Prior to joining the Department, she was executive director of the Arizona Groundwater Management Study Commission, which was established in 1977 to develop a comprehensive groundwater management code for Arizona. She participated in the negotiation of the Arizona Groundwater Management Act of 1980 and supervised the drafting of the Act.

Excerpted from "Centralized State Management of Groundwater: The Arizona Case," ***Groundwater Management: A Key Issue for the '80s*** (T. James and S. Ballard, ed.), to be released in 1985 by MacMillan Publishing Company for The American Association for the Advancement of Science. This material will also be published in 1985 by the University of Texas at Austin, Center for Research in Water Resources, in the proceedings of the symposium "Groundwater — Crisis or Opportunity," October 1984.

Alternative Financing: Who Pays?

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As increased federal deficits result in decreased federal water programs, state dependence on direct financing will diminish. The resulting process of achieving self-sufficiency in financing will lead to the exploration of alternative funding mechanisms, new funding sources and innovative public/private sector partnerships.

The 1980s mark the development of a slow but steady awareness of a new type of water problem. The issues of water quantity and quality are slowly merging as the complex interrelationships among all uses of water are recognized, and the realization grows that freshwater is a total resource and must be managed as such. This realization is fundamental to the burgeoning awareness of today's most difficult water problem: The nation as a whole is no longer able or willing to directly subsidize water facilities.

Facing the Need for Maintenance and Rehabilitation

This problem derives from a series of important facts. Foremost is the hundreds of billions of dollars in federal monies already spent to construct water-related facilities. With this emphasis on construction, maintenance has been deferred, and, as a result, much of this infrastructure is now in need of major rehabilitation and repair.

In addition to direct costs, there are real but hidden costs of not dealing with the problem.

Estimates for new construction and repair range in the hundreds of billions of dollars: $120 billion for wastewater treatment; $200 billion for water treatment; $500 billion for municipal, industrial and agricultural water supply, flood control, hydroelectric power, and other related water projects. While there are no comprehensive hard data, these estimates are indicative of the relative magnitude of the problem.

Also, maintenance and construction of water facilities are integral to the economic health and growth of this nation and its communities. Thus, in addition to direct costs identified above, there are real but hidden costs of not dealing with the problem. These costs show up in productivity and growth declines, system failures, expensive emergency repairs, general economic stagnation and unemployment.

Fewer Federal Programs

Increased federal deficits have resulted in decreased federal programs.

In one sense, the final assessment of these needs is not relevant, since the magnitude of the problem is so great, there will not be enough federal dollars available in the foreseeable future to meet any significant portion of these needs. In short, increased federal deficits have resulted in decreased federal programs.

It is helpful to put this into a real dollar-and-cents perspective. In the $1 trillion current budget, the funds devoted to water resources are small — and even that amount is shrinking.

Each dollar in the federal budget is roughly distributed as follows: 42 cents for social programs and benefit payments, 29 cents for national defense, 11 cents for grants to state and local governments, 13 cents for interest on the national debt, and 5 cents for everything else.

Of that remaining nickel, one penny is allocated for natural resources and environmental programs. Of that penny, only one-third of one cent is allocated for water — and that amount is going down. By implication, then, if federal funds are not forthcoming, the financial burden shifts to the states, localities and the private sector.

At the state and local levels, there is no immediate capacity to raise the necessary billions of dollars for water and wastewater facilities. State and local budget pressures stem from a number of factors, including drastic cuts in federal grants, high interest rates, and reduced attractiveness of municipal bonds due to accomplished and proposed changes in federal tax law.

A major factor affecting the potential availability of state and local funds for water facilities is a fear that federal cuts in the financing of social services — and in revenue-sharing dollars — will force increased demand for state and local funding of these services.

Proposed Restraints on State Responses

New and serious threats to local financing capabilities are proposed by the Department of Treasury's "tax reform" proposals. Many analysts see these proposals as an assault on traditional sources of state and local revenue raising, including the tax-exempt municipal bond market. Key concerns include proposals to:

Only one-third of one cent is allocated for water — and that amount is going down.

- Eliminate the deduction for state and local income, property and sales taxes;
- Further restrict the arbitrage profits which state and local governments can earn on investment of the proceeds of a tax-exempt issue even though, in most states, these proceeds can only be used for the project the bonds finance;
- Eliminate tax-exempt financing for certain "exempt" purposes such as sewage and water facilities where more than one percent of the proceeds from industrial development bonds (IDBs) would directly or indirectly benefit a non-governmental party;
- Eliminate the investment tax credit (ITC) and accelerated cost recovery system (ACRS) which have served as incentives for private capital investment.

In the absence of direct federal funding, it seems reasonable — if states and local governments are to bear an increasing share of the financial burden for water — that IDBs and tax benefits be available to communities seeking affordable ways to provide services essential to economic viability. If private capital is to be attracted into these traditionally public projects, then economic incentives for capital investment must be available. The Treasury proposals head in precisely the opposite direction.

If private capital is to be attracted into traditionally public projects, then economic incentives for capital investment must be available.

Taken together, these proposed changes could result in reducing and limiting the access of state and local governments to the tax-exempt bond market. This will occur because of a number of shifts in the economy — changes in the amount of real revenues a given tax will generate, changes in the relative strength of various sectors of the economy, and changes in the creditworthiness of state and local governments.

All in all these proposed reforms could result in further decreasing the ability of state and local governments to finance the necessary water projects needed to protect public health and promote economic activity — at a time when state and local governments need to be in a position to pick up a greater portion of the tab.

Informed, responsible local officials may want to boost spending for water, but the counter-pressures of unemployment and the threatened loss of city services such as police or fire protection are more immediate and visible needs. Many public works services lack glamour and visibility and, therefore, tend to go unnoticed until they fail.

The public perception is that water is cheap, clean, easily available, and, therefore, not worthy of a high priority for investment. This is an ironic — and self-defeating — outcome of the successes of the past forty years to subsidize the provision of water.

Water Pricing and Public Perceptions

Because of the massive federal expenditures in the past, the price of water has generally been disproportionately low in comparison to the true cost of developing and maintaining the facilities. A community will experience somewhat of an uproar if the average home water bill increases $6 per month — at the same time that many families spend $8-10 or more per month for special entertainment options on television. Implicit in this behavior is the perception that water is not "worth it."

This is a sad statement on our populace's awareness of the implicit value of water and of the critical role that water plays in our ability to sustain life itself, let alone our economy and standard of living. A commitment to providing and maintaining water infrastructure will require a major evolution in the public's attitude toward and perception of the value of water, the cost of water and the price that must ultimately be paid for it. Public education and awareness programs must be a key ingredient in meeting the water challenge. This is the true water problem of the 1980s.

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A commitment to providing and maintaining water infrastructure will require a major evolution in the public's attitude toward and perception of the value of water, the cost of water, and the price that must ultimately be paid for it.

Identifying the Problem

The process of problem identification and solution development is just beginning. Over the past few years the print and broadcast media have covered the issue of the nation's crumbling infrastructure. These publications have tended to group all construction needs together, regardless of their purpose. Implicitly, highways, water and public buildings are presented as having equal priority.

Since 1982, however, there have been several successive efforts by the business, professional and political communities to address the issue of financing water infrastructure. One of the most important of these efforts is a congressionally-led forum which was created in 1983. Under the direction of Chairman Senator Dennis DeConcini (AZ) and Co-Chairmen Senator Dave Durenberger (MN) and Congressman Robert Roe (NJ), the National Water Alliance brings together a bi-cameral and bi-partisan committee of congressional leaders. Its board of directors is comprised of key leaders in the business, professional, academic and environmental communities.

The Alliance recognizes that Congress has been a microcosm of the nation's conflicting regional needs for water financing — with the water quality problems of the Northeast and Midwest often pitted for funding directly against the water quantity problems of the West and Southwest. The net result has often been a bitter stalemate.

The Alliance's goals are to develop a coherent national water policy and to create and implement a national public education program on the cost, value and importance of water. The National Water Alliance provides a long-awaited policy-making and education forum for all members of the public, which may lead the way to a breakthrough on water financing.

Growing Federal Awareness

Legislatively, Capitol Hill has reflected the awareness of the new water problem of the 1980s. In the last Congress no fewer than eight different bills were introduced which would provide for inventories of water and sewer systems, the development of 10-year capital investment plans, the creation of a national capital budget, and various mechanisms for matching grants or loans to states for the establishment of infrastructure financing banks. While these bills focused on the overall water problem, the controversy has continued on water resources legislation.

The main issue, unchanged since 1976, is cost-sharing. Administration proposals emphasize vastly increased non-federal cost-sharing and, most significantly, up-front cash contributions by local and state governments instead of the pay-as-you-go, low-interest mode of the past.

The significance of these legislative recommendations — the inventory study, capital budgeting proposals, infrastructure bank creation and water resources cost-sharing proposals — is that, individually and collectively, they represent a recognition by the federal government that there is a serious water problem based on a new economic reality and that the solution lies in the creation of alternatives to the traditional direct federal financing of the past.

Water Committees vs. Tax Committees

A main issue in the transition from major direct federal grants to alternative forms of financing will be the interplay — or lack thereof — between the substantive water committees in Congress and those responsible for tax legislation. In the last Congress, while the water-related committees were painstakingly searching for solutions to the tremendous water financial needs, the tax-writing committees were proposing to restrict existing incentives for alternative systems of financing.

The Alliance recognizes that Congress has been a microcosm of the nation's conflicting regional needs for water financing.

For example, IDBs were under attack at the federal level because of perceived revenue losses to the U.S. Treasury and perceived abuses due to particular uses of IDBs — racquetball courts, for example. Certainly major abuses should be prevented. But to go beyond the specific problem area can wreak havoc with a critical financing mechanism. IDBs are now used by state and local governments to finance a wide range of public purposes, including water and wastewater treatment facilities which are owned and operated by private companies to the benefit and welfare of the entire community.

In another provision, significant restrictions would have been placed on the tax benefits associated with service contracts. These contracts shift the responsibility for water projects from the public to the private sector. The private sector would design, construct, own and operate the facility providing services to the community. Under a long-term service contract, the company would be responsible for all state and federal permitting requirements and for plant operation and maintenance.

The House proposal would have put into law a series of restrictions on these contracts, making it more difficult for companies to qualify for investment tax credit and accelerated cost recovery benefits. By making these benefits less accessible, private sector investment for the provision of public services would have been discouraged.

There is a serious water problem based on a new economic reality . . . and the solution lies in the creation of alternatives to the traditional direct federal financing of the past.

Recognizing this, a provision was accepted in the Senate which would provide special rules for property under contract involving water treatment works facilities. This provision would protect against the abusive use of tax-exempt entity leases for tax avoidance and yet support national water goals.

Legislative Results—and Effects

As so often happens legislatively, the results of the tax bills — from the standpoint of water — were mixed. In the Deficit Reduction Act of 1984 (P.L. 98-369) Congress did impose a population-based cap on each state's ability to issue IDBs. The cap is the greater of $150 per person or $200 million per year. Bonds issued in an amount which exceeds the cap lose their tax-exempt status.

The impact of this Act was immediate. No less than fourteen states had to reduce their IDB issuance as compared to previous years. At least twelve states have initiated an intrastate allocation mechanism — all different, creating implicit barriers to interstate industrial development.

The picture in regard to the service contracts is more positive. The provision in the Senate bill did prevail and wastewater service contracts must meet a reasonable set of criteria for tax purposes, preserving the incentive of ACRS and ITC. However, where these benefits are used, the project may not utilize IDB financing — a definite loss for the financial viability of these projects.

While the Congress continues to work its way through the complex morass of water and tax legislation, the states are moving to address the issue of water financing. Led politically by the governors and managerially by senior water officials, the states are key to inter- and intra-governmental cooperation on water issues. As the federal government recedes from major financial participation, the mantle falls — whether by choice or by default — on the states.

State Initiatives

Overall, the states can be expected to play a more active role in financing by providing both technical and financial assistance to non-federal sponsors, as well as by acting as sponsors themselves. States are already providing leadership in project financing through the creation of bond banks, financing authorities, loan and guarantee programs, dedicated revenue sources and the like.

The National Governors' Association conducted a survey of governors and their staffs regarding priority issues facing the states over the next four years. Water problems was selected as the number one issue.

It must be recognized, however, that states have widely varying financial capacities to take up the slack. Some have their own version of a water trust fund in the form of severance taxes on mineral deposits. Others, however, are constitutionally limited in their borrowing power and fiscal capacities.

Also, a number of states and localities have encountered increasing voter resistance to proposals for bond referenda, increased user charges, operation and maintenance charges and local property (ad valorem) taxes to finance governmental services.

The State Perspective

In 1982-1983 there were some important signals of the way states view water issues. For example, the National Governors' Association conducted a survey of governors and their staffs regarding priority issues facing the states over the next four years. Water problems was selected as the number one issue.

Another important signal was provided by the Interstate Conference on Water Problems (ICWP), a 25-year-old national association of state and regional water officials. In 1983, ICWP selected cost-sharing as the focus for special study by a task force of water officials. The battles over cost-sharing during the last seven years have primarily focused on the percentages now in the law and those being proposed for non-federal contribution. Of significance is that, while still certainly concerned about the actual percentages, the ICWP Task Force demonstrated a willingness to negotiate and an awareness that the key issue had shifted from percentages to capital. In its report, the Task Force stated:

The states, like the Congress, are slowly but surely turning away from traditional means of doing business.

> . . . state water experts agree that the fundamental issue in water project financing is not cost-sharing but is, instead, capital formation. In order to adequately resolve water infrastructure problems, the states believe that a comprehensive reform of the current system for selecting and developing water facilities is essential.

The states, like the Congress, are slowly but surely turning away from traditional means of doing business.

Working Together on New Approaches

In 1984, in a classic example of a strong state-federal partnership, ICWP and the U.S. Army Corps of Engineers cosponsored a series of regional water project financing workshops. The ICWP-Corps workshops brought together several hundred members of the local, state and federal water communities, along with the investment banking and financing communities, to mutually explore financing problem areas and begin to identify pragmatic solutions. The bottom line was realization that, regardless of the outcome of pending water project legislation, the state and local levels of government must be prepared to pay more.

Nationally, we are in the midst of a major transition in the way all water-related facilities are financed. To accomplish water investment in the short- and long-term future, a new political-institutional approach must be put into place. All levels — local, state, regional and national — must move toward a shift in their views regarding the value of water, the willingness to pay for water, and the types of mechanisms used to finance the construction, repair, and operation and maintenance of water facilities.

Creative approaches to financing are needed to break out of the traditional federal-grant-plus-government-revenue bond structures and look instead to the development of privatization and to combinations of public-private financing approaches. The entire water community — citizenry, consulting engineers, equipment manufacturers, and state, local and federal officials — must become educated as to alternative modes of financing. Now, indeed, may be the time for a new look at the role and responsibilities of the investment banking community as true financial advisors and strategists, not merely brokers of bond issues.

All levels — local, state, regional and national — must move toward a shift in their views regarding the value of water, the willingness to pay for water, and the types of mechanisms used to finance the construction, repair, and operation and maintenance of water facilities.

Overcoming Barriers To Achieve Objectives

On the pragmatic level, the issue becomes one of identifying state and local legal barriers to a variety of funding mechanisms and moving constructively to resolve them — all within the broader context of a well thought-out financial strategy for the state or locality. Such a strategy must take into account the community's short- and long-term capital formation needs, including reasonable options for technological and engineering solutions.

The achievement of these objectives requires consideration of the following fundamentals:

- Public awareness and education as to the true value and cost of water must be implemented to obtain the commitment to provide financing;
- Artificial demarcations among water purposes — simplistically, quality and quantity — must be blended into a more sophisticated realization of the ongoing, indivisible interrelationship of all water uses, an understanding that freshwater is a total resource and must be managed as such;
- A problem-solving approach to water management and financing must replace regional rivalries;
- Recognition must begin to take place of the new role of the financial community as financial advisor from the time of project inception, working hand-in-hand with the consulting engineer to identify needs, solutions and the best means of financing;
- At the federal level there must be a dynamic process to remove existing barriers to joint governmental/private ventures, including an examination of tax laws, procurement laws and regulations, and the creation of incentives for state/regional financing mechanisms.

A new federal-state relationship focuses not on direct financing but on fostering self-sufficiency in financing.

Reaching these goals will require a dynamic process of public education; municipal, state, and regional coordination; and a new federal-state relationship which focuses not on direct financing but on fostering self-sufficiency in financing. The lesson of the old adage must be learned:

> "Give a man a fish, and he has food for a day.
> Teach a man to fish, and he will have food for a lifetime."

About the author: Joan Kovalic practices law in Washington, D.C., with the firm of Taft, Stettinius & Hollister. She has had extensive private and public experience in water law and financing issues, representing businesses, state and local governments and organizations such as the National Water Alliance and the Interstate Conference on Water Problems. She formerly served as deputy director of EPA's Municipal Construction Grants Program and the U.S. House of Representatives assistant counsel for Water and Environment.

Exploring Options for Water Project Financing

The Honorable Bruce Babbitt
Governor of Arizona

State and local governments face the same problem the Congress does — too many competing demands for available tax revenues. Reductions in available federal — and state — financing necessitate consideration of innovative revenue options as well as more efficient water conservation and management alternatives.

Western water is in transition — uses, values, demands, financing, even our water law and institutions are evolving as we move from an era of unconstrained growth to one which has to focus more on equity, preservation, rehabilitation, conservation and best use of limited resources.

Water project financing will be much more difficult in the future. In addition to the decline in federal financing, state and local governments face the same problem the Congress does — too many competing demands for the available tax revenues. Bond markets face growing demands from both the public and private sectors for financing, and even bonds for the most economic water projects may involve large amounts of capital, very long terms and some uncertainty in revenue sources. Borrowing is not a substitute for a revenue source or an appropriation.

State and local governments face the same problem the Congress does — too many competing demands for the available tax revenues.

Financing Options

Some of the options for raising revenues for water development include:

1. Increased user fees. Such fees could include full cost pricing, additional beneficiary charges, and depletion charges such as pump taxes. Although theoretical economic efficiency would be enhanced, social equity could be seriously disrupted, and with 90 percent of the water used by agriculture, the impacts on consumer prices, land uses and small communities could be substantial.

2. Increased hydro rates. This option would expand the use of the traditional "cash register" for Western water projects, but it runs immediately into the reality that most Western hydro power is sold, by law, at cost to "preference" customers — rural cooperatives, small municipalities and others who are not well served by private utility markets.

An alternative to some financing demands, such as new project development, may be found in increased conservation and management to avoid new construction.

3. Increased private participation. "Privatization" has appeal and will be used to construct more and more projects. The fact remains, however, that most Western water development is beyond the scale of private companies and often involves some subsidization of certain users. Privatization also raises the question of loss of control, coordination and capture of benefits from a public resource.

4. State and local taxes. General revenues often provide basic funding for non-federal Western water needs — small or rural municipal supply, irrigation, rehabilitation and other subsidized or "public good" purposes such as flood control, recreation and environmental protection. Most states, however, do not have the ability to significantly increase appropriations for water development at the same time they are increasing outlays for education, health care and other programs for which federal support is also being reduced.

5. Continued federal financing. Periodic authorizations and appropriations will continue to be made, particularly in election years, but most observers doubt that federal financing will ever return to the pattern of the '50s and '60s. Other commitments and priorities will claim available federal revenues first. At the same time, ongoing federal responsibilities remain — Indian water development, treaty obligations, multi-state projects, projects serving national purposes, and environmental protection. We need to be sure that the federal government lives up to those responsibilities and does not pass them on to states.

Conservation and Management Options

An alternative to some financing demands, such as new project development, may be found in increased conservation and management to avoid new construction. The advantages of such steps are that a state may save water and avoid the costs of new storage, new water treatment plants, new distribution lines and other costs related to new construction.

The disadvantages are that, with the hydrological connection between surface water, groundwater and return flows, and with the multiple reuse of water in all Western rivers, conservation benefits may not accrue to the conserver, and downstream impairment may preclude conservation measures.

Such conservation and management options include the following:

1. Conducting the technical and legal analyses to optimize conservation throughout a river basin.
2. Facilitating transfers and allowing water to reach market prices. This, too, could free up large quantities of water. The major impact of such a step, however, would be on irrigated agriculture: driving up the cost of production, reducing the amount of agriculture and challenging our country's cheap food policy.
3. Accepting less than optimal water supply, including restrictions on time or frequency of water use, reduced reliability of quantity or quality of water supply, and statutory limits on growth.

In the case of financing, as well as the conservation alternative, virtually everyone will be affected.

Exploring Potential Solutions

In the case of financing, as well as the conservation alternative, virtually everyone will be affected. We need to establish a mechanism to explore more fully the potential, the ramifications and the steps needed to implement the various options.

The Western Governors' Association is resolved to seek solutions to these very difficult problems. We intend to exercise our leadership to preserve and enhance the outstanding system of water development which has enabled the West to develop and make its contribution to the nation. Our obligation is to the future.

About the author: Governor Babbitt has been Arizona's chief executive since 1978. His many achievements include having successfully guided the state in establishing its far-reaching Groundwater Management Law.

Excerpted from the Foreword of ***New Challenge, New Direction: The Water Policy Report of the Western Governors' Association.*** Reprinted by permission.

An Environmental Trust Fund: New Jersey's Innovative Proposal

The Honorable Thomas H. Kean
Governor of New Jersey

New Jersey's dilemma is common to all states: how to repair, maintain and rebuild sewers and water supply facilities without the funds to do so. New Jersey's approach, however, is unique: an Environmental Trust Fund to provide a viable state-based alternative to rapidly disappearing federal financing or 100 percent local financing.

The need to repair and maintain our system of roads, bridges, sewers and water supply facilities has been well documented, but it is particularly acute in northeastern industrial states such as New Jersey. The following statistics demonstrate how dramatic New Jersey's problem is:

- New Jersey has more vehicles per highway mile than any other state.
- Our roads carry four times more traffic than the national average.
- Fifty billion tons of freight are transported daily on our state's rail and highway systems.
- About 4,500 of our 6,000 bridges are in need of repair.
- The Port Authority of New York and New Jersey estimates that its total infrastructure needs of the New York-New Jersey region for the next decade will be roughly $40 billion.
- To meet federal Clean Water Act goals, we must construct 237 wastewater treatment plants in the next decade. With the funding currently planned, we can only build 24. We are now receiving roughly half the federal appropriations for sewer projects that we received in the 1970s.

In light of these facts, it is obvious that New Jersey, perhaps more than other states, must address the infrastructure problem quickly, effectively and in a sustained manner.

We've got infrastructure needs of staggering proportions and shrinking financial resources to meet them.

The Problem of Funding

Unfortunately, the supply of funds for doing so is neither readily available nor readily obvious. Most would agree that Congress is not likely to increase federal funding for programs like the construction grants program. It is widely recognized that the federal deficit is already too large, and if the experience of the past few years is any guide, Congress is not willing to increase spending on public capital projects at the expense of other programs.

The state budget is not the answer, either. In 1982's $6 billion budget, the $80 million we had allocated for infrastructure needs was cut back to $20 million, and the need is more on the order of $20 billion.

Another major source of financing for capital improvements is proceeds from the sale of state general obligation bonds, but we obviously can't expect to sell enough bonds to cover the gap between $20 million and $20 billion.

Our counties and municipalities are in no position to pick up the entire burden. Local governments in New Jersey already have an outstanding debt of $3 billion.

That, in brief, is what we're faced with in New Jersey. I suspect it's typical of what states and municipalities are facing all over the country. We've got infrastructure needs of staggering proportions and shrinking financial resources to meet them.

The Need for a Permanent Source of Capital

To address this problem, we brought together several key players from the state government and the private sector as well. We got very helpful, expert advice from innovative people in the investment community, and came up with a radical rethinking of the way we go about paying for roads, bridges, sewers and other public systems. The result was our proposal for a New Jersey Infrastructure Bank.

Since that original proposal, we have essentially broken down New Jersey's infrastructure problem into two separate catagories: transportation infrastructure and environmental infrastructure.

Last year, we succeeded in passing the legislation necessary to address the transportation concern. The legislature created a $3.3 billion Transportation Trust Fund to finance needed improvements in New Jersey's extensive highway and mass transportation network.

The Fund will rely on several sources of capital: annual appropriations of state revenues garnered from a portion of our gas tax; excess revenues generated by the state's profitable toll roads; and increased registration fees for trucks. This money will be bonded to yield the maximum amount, and the total pool of funds generated will be used to match available federal dollars to complete the program.

County and local governments can reduce costs and hold down the rates ultimately charged to users.

On the environmental side, we have changed the original Infrastructure Bank proposal into a plan for an Environmental Trust Fund. The Environmental Trust would be used to finance two of the most pressing needs facing all states — wastewater treatment construction and the construction of resource recovery plants for solid waste.

This proposed Trust would provide a permanent source of capital for infrastructure projects by loaning rather than granting funds generated by appropriations and general obligation bonds. Once funds were appropriated to or deposited in the Trust, they would be lent at low interest—or in some cases, no interest at all—to units of government undertaking the construction, rehabilitation, replacement or repair of infrastructure. As the loans were repaid, the Trust would have a permanent revolving fund for the state's basic infrastructure needs.

Since the Trust would provide a permanent, predictable source of funds, municipalities and counties could plan for essential construction or repairs rather than just respond to emergencies.

The Trust would also serve as a statewide financing vehicle for the local share of project costs. At the request of a community, the Trust would issue bonds on the community's behalf for the portion of the project cost that the loan does not cover. The Trust could pool local borrowing requirements to create bond issues large enough to provide significant savings in financing and issuing costs.

Finally, the Trust would function as a vehicle through which the state itself could issue revenue-backed bonds for various infrastructure purposes. This would be possible where a new or existing source of revenue was dedicated to the Trust to meet debt service requirements.

In addition to the proposed Trust, we have signed into law innovative privatization legislation for wastewater, water supply and resource recovery projects, under which local governments can contract with private firms for the construction and operation of these plants. In this way, county and local governments can reduce costs and hold down the rates ultimately charged to users.

The Advantages of an Environmental Trust

One of the Trust's advantages is that it would reduce reliance on the federal government. Since very few projects can be expected to make the federal grant list, the Trust will provide a vehicle for building hundreds of additional needed projects. For those projects, I have proposed to capitalize the Trust with state appropriations and state bond monies to provide the seeds for future construction. The establishment of a revolving Environmental Trust would allow invested capital to grow, thereby gradually reducing the demand for additional annual appropriations.

Second, we believe the Trust would encourage the type of financial planning that local and county governments need in order to complete large projects and avoid massive debts at the local level. Moreover, since the Trust would provide a permanent, predictable source of funds, municipalities and counties could plan for essential construction or repairs rather than just respond to emergencies.

Third, the Trust could provide the resources necessary to meet environmental standards. In the absence of necessary federal support, this would otherwise be impossible.

Finally, and most importantly, the Trust would address the number one concern of our citizens: jobs. Repairing our basic infrastructure is absolutely vital to our ability, both in the state and the nation, to provide the services and facilities that businesses need to operate smoothly and move their products. Whenever I talk to a business leader about locating or expanding a plant in New Jersey, he asks about the infrastructure. We now have the ability to answer the question on transportation, but the financial picture for environmental projects remains cloudy in the absence of the Environmental Trust.

Of course, just the building of the infrastructure is a source of jobs in itself. Our Department of Environmental Protection has estimated that the level of investment we've proposed for the Environmental Trust would create 90,000 jobs in the area of wastewater treatment alone. Our Department of Transportation has predicted that our Transportation Trust Fund will generate close to 100,000 jobs.

Reduced federal appropriations and increased local responsibilities are realities that we have to face up to.

The Reality of the New Jersey Response

This proposal raises an important question: How will local governments pay back the loans from the Environmental Trust? Won't they have to increase local fees?

The answer is yes. User fees will have to increase, but not as much as they would if communities had to finance projects entirely with local debt. Remember, under the current schedule of authorized funding for federal sewer construction, over 200 of the 257 planned projects cannot expect to receive any federal funds. For these projects, a Trust loan would be much better than 100 percent local financing.

It appears that reduced federal appropriations and increased local responsibilities are realities that we have to face up to. The New Jersey Environmental Trust would help us adjust to the realities today and would provide future generations with a permanent revolving fund to help pay for the infrastructure building of tomorrow.

About the author: Governor Kean has been New Jersey's chief executive since January 1982. He previously served in the state legislature for 10 years, during which time he sponsored the bill that created the New Jersey Department of Environmental Protection. As governor, he has been instrumental in focusing the resources of the state on environmental concerns, as well as on such innovative financing options as privatization and revolving loan funds to maximize the impact of available capital for water related programs.

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PART III:

Public/Private Sector Responses

The federal government won't do it, and the states can't. If the private sector won't meet the challenge, who will?

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The Galloway Group, Ltd.

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The National Water Alliance: A Unified Framework for Regional Concerns

James J. Magner
Executive Director
National Water Alliance

Water management responses have historically been fragmented, regional, site-specific and uncoordinated. The National Water Alliance is an attempt to unify responses to common water resource issues by providing a framework for unifying regional concerns.

When the Clean Water Act of 1972 declared that the nation's waters must be made "swimmable, fishable and drinkable" within the next decade, we rejoiced. At last the creeping pollution that had blighted the country's waterways would be cleaned up. Such travesties as the killing of one of the world's Great Lakes would be corrected. And indeed, Lake Erie has come back to life.

But what has also come back to life in the last year or two is the awareness that problems with our water resources have only just begun, and that pollution represents a small part, perhaps a symptom, of larger and far more complex conditions.

A Complexity of Water Problems

The problems are political, legal, financial and sociological.

No longer are people laboring under the misconception that everything will be all right if we just spend enough money to clean up the surface and groundwater we have contaminated. The problems go far beyond that. They are political, legal, financial and sociological. They overlap and intertwine, and, in order to sort them out, the professionals, the political leaders, the environmentalists, the corporate leaders, the lawyers and the everyday consumers must first realize that we are all part of the problem and that we must all become part of the solution.

The plain truth is that **water in America is becoming unusable** for both man and beast. We fear severe health problems from the contamination of both surface water and groundwater. Deteriorating or insufficient water supply and wastewater treatment facilities and related systems are threatening the day-to-day functioning of our older cities and hampering the planning of our newer ones. Groundwater depletion is affecting not only the Midwest farm states but also hundreds of cities all over the country.

What we are learning is that, although water is free, it's not cheap.

What we are learning is that, although water is free, it's not cheap. In conflict with our usual American confidence that there is a quick and easy solution to everything is the realization that we as a country are financially "strapped." As we begin to discover what might be thought of as a hidden crisis, the government has come face to face with a problem of its own: an enormous federal deficit.

As recent public and private studies tally up the "needs," the costs for just fixing our current problems (Superfund, wastewater treatment grants, infrastructure financing and all of the associated programs and projects) figure in the hundreds of billions of dollars. It has become obvious to readers of these various studies that there won't be enough money at either the state or federal levels. It is perhaps not so obvious that less spending will require better planning and better management.

Regional Conditions and a New Understanding

In the past several years, congressional leaders found state-by-state battles for funding becoming increasingly bitter. Ultimately, no one was coming out the winner. A movement in Congress toward the formation of regional coalitions had begun. Senator Dennis DeConcini (D-AZ) and Senator Paul Laxalt (R-NV) were co-chairmen of one of these groups, the Senate Western Coalition, which served as a forum to discuss natural resources and other concerns common to the West.

This perspective brought a new understanding—that water problems are not entirely unique to each community or even to each area of the country. Rather than build regional fences and suffer the resultant hostilities, Sen. DeConcini felt that water issues demanded a specific national focus as well as local and regional agreements.

The Alliance: A National Focus

After talking to several other members of Congress and finding striking similarities in their home state water woes, Sen. DeConcini developed the concept of the National Water Alliance. He was joined on the executive committee by seven other congressional leaders with a common interest in the protection and effective use of water as the essential ingredient in life: Sen. Dave Durenberger (R-MN); Rep. Bob Roe (D-NJ); Rep. Dick Cheney (R-WY); Rep. Thomas Foley (R-WA); and Rep. John Paul Hammerschmidt (D-AR). Representing virtually every region of the country, the National Water Alliance became a bipartisan effort to recruit others throughout America who share the same concerns.

Less spending will require better planning and better management.

The original Alliance members believed that their participation should represent only part of the effort. In addition to water professionals, scientists, environmentalists and other concerned citizens, the original members looked to the vast untapped pool of leadership in the private sector. Business needs clean, usable water as much as the private citizen, and perhaps even more. And as it becomes increasingly apparent that we will not be able to spend our way out of our corner, the private sector will have to assume a much larger responsibility in water management, planning and financing.

A Coalition of Diverse Interests

The private sector will have to assume a much larger responsibility in water management, planning and financing.

In 1983-84 the National Water Alliance (NWA) held four conferences around the country in a first step to build a coalition of diverse interests. These conferences looked at such basic concerns as research and information needs, urban and rural policy trends, and long-range environmental impacts. One result of this process has been a legislative recommendation for a national water research council, which would include a research planning and support center and a national clearinghouse for water-related information.

~~In 1985,~~ after polling its current membership of approximately 100 corporations, 68 nonprofit organizations and 200 individuals, the Alliance is taking an active role in developing legislative options and other policy proposals for several specific topics: groundwater, water supply and wastewater treatment, and infrastructure financing and development. These topics include both water quality and quantity considerations.

The Alliance Board of Directors has created task forces, consisting of NWA members, to meet on a continuing basis this year and to make policy recommendations directly to the Board. The task forces are approximately 40 percent corporation members, 40 percent nonprofit members and 20 percent individuals. The task force program gives each member the opportunity to meet with the entire spectrum of highly respected professionals and leaders from all over the country to forge both short-range and long-term policy recommendations.

The response has been very enthusiastic. It is expected that the task forces will include major national legislation such as the Clean Water Act, the Safe Drinking Water Act, Superfund, water project development and groundwater legislation on their 1985 agendas.

A Need for Public Education

Regardless, however, of what the policymakers finally decree, the lawmakers legislate and the agencies regulate, water pollution and depletion problems will continue unless the general public is aware of the concerns and willing to accept, support and shape the official proclamations. As important as the National Water Alliance considers a cohesive national water policy to be, there is an even greater recognition of the need for public education and information.

As important as the National Water Alliance considers a cohesive national water policy to be, there is an even greater recognition of the need for public education and information.

The Alliance is sponsoring public service announcements developed by the Freshwater Society and is developing additional public service announcements to be distributed nationally. The NWA has also begun a series of five-minute information programs for cable television distribution on the "Focal Point" program, featuring specific water problems and possible solutions. These programs are supplemented by an NWA ***Quarterly Report*** and other publications, conference summaries and a media referral service.

We believe the goals of the Clean Water Act of 1972 should not be forgotten. It is imperative that we keep the country's water "fishable, swimmable and drinkable," and we must keep this nation liveable. We can do so by starting to treat water as the immensely precious resource that it is, and by joining together to make America's waters usable.

About the author: James Magner has served as executive director of the National Water Alliance since 1983. Previously he served as legislative assistant to U.S. Senator Dennis DeConcini, specializing in a range of water issues and other natural resource and energy policy concerns.

A Need for New Ideas and Institutions

Senator Dave Durenberger
R-Minnesota

We are entering a new period of environmental protection. The easy things have been done. They were done in the first environmental decade — the 1970s. We have the major laws in place. We have applied best available technology to the point sources of water pollution, to the stationary sources of air pollution and to our automobiles. We have designed the sewage treatment plants and identified the hazardous waste pits that need to be cleaned up.

Another decade of work, however, remains to be done: nonpoint source pollution, small generators of hazardous waste, small water systems that cannot afford to test, leaking underground storage tanks, acid precipitation, and millions of automobile owners who put leaded gasoline through unleaded cars are problems to be addressed in the 1980s.

These problems are much more difficult to resolve. Best available technology standards issued by a federal agency and imposed on big industries at a few locations will not solve these problems.

It is getting to the point where the problem is each and every one of us, not just a few big polluters. We will need new tools and economic incentives to change the behavior of millions of Americans.

We will need new tools and economic incentives to change the behavior of millions of Americans.

It is my hope that the National Water Alliance can be in the lead in creating those policy tools. I have learned that I can't just sit on a committee in Washington and tell EPA to "go get 'em." We have gone about as far as we can go with centralized solutions.

To make additional progress in improving the quality of our surface waters and to get a good start on protecting our groundwater supplies, we will need new ideas and new institutions. The National Water Alliance is working to find them.

Excerpted from remarks presented at the National Water Alliance Midwest Water Symposium, St. Paul, Minnesota, May 18, 1984.

The Center for the Great Lakes: A Model of Private Initiative

William G. Milliken
Chairman of the Board
The Center for the Great Lakes
and
Former Governor of Michigan

In the face of a decreasing federal role in regional issues, the need for a coordinated, watershed-based approach to addressing such issues has become increasingly clear. The Center for the Great Lakes is a public/private sector partnership with one shared regional concern: the Great Lakes.

A Many-Faceted Gem

The Great Lakes constitute the most precious freshwater gem on the face of the earth.

In surface area, Lake Superior is the world's largest freshwater lake; Lake Huron, the third; Lake Michigan, the fourth; and even the two smallest of the Great Lakes — Erie and Ontario — rank 11th and 15th, respectively, among freshwater lakes.

Containing one-fifth of the surface freshwater on the earth, the Great Lakes form a coastline longer than the Atlantic and the Gulf of Mexico combined. One in ten North Americans relies on the Great Lakes for drinking water.

The Great Lakes Basin has provided the water necessary for the production of steel, chemicals and heavy manufacturing industries. At the same time, they have served as a source of inspiration and splendor for generations of Americans.

The Great Lakes have shaped our region's past, and they will determine our region's future.

The Great Lakes have shaped our region's past, and they will determine our region's future.

Barriers to Effective Great Lakes Management

Today, more than ever before, our tremendous Great Lakes resources are threatened by competing uses and inconsistent management. Eight states, two provinces, two international agencies, one interstate commission and two federal governments share management responsibilities for the Great Lakes.

The history of that management is filled with examples of disagreement and inconsistencies in objectives and techniques. Decisions which involve large financial commitments and those which have long-term impacts are often made independently by one jurisdiction without adequate consideration of the regional consequences of such actions. Rivalries within the region have often interfered with the development of sound solutions to important regional problems.

Recently, these management problems have been compounded by a series of recessions which have had a severe impact on Great Lakes industries. These recessions have also affected the revenues available to local units of government to meet environmental and economic development responsibilities.

At the same time, federal cutbacks in Great Lakes resource management programs in the United States have been extensive. For example, the only federal/state agency developed to coordinate activities on the Great Lakes in the United States, the Great Lakes Basin Commission, has been abolished.

Finally, controversies between the United States and Canada, over such issues as transboundary pollution and toxic chemicals entering the Lakes, are opening serious breaches in the traditionally good relations between the two countries.

A Regional Approach to a Regional Concern

The environmental and economic futures of the Great Lakes region are inextricably linked. Throughout history the Lakes have provided the foundation of our regional economy. They continue to do so today. The Great Lakes are the home of 25 percent of all United States chemical firms and 80 percent of United States iron ore production. They support a sport and commercial fishery worth $1.16 billion per year, a tourism industry worth $15 billion, and a shipping industry worth $26 billion.

It was because of this critical link between the environmental and economic futures of the Great Lakes regi[illegible]at, in early 1982, The Joyce Foundation called together a meeting of foundatio[illegible]orporation and environmental leaders from throughout the region to discuss the serious issues confronting the use of the Great Lakes. The conference attendees developed a list of high-priority resource issues for the region, as well as an action agenda.

The environmental and economic futures of the Great Lakes region are inextricably linked.

A key recommendation of the conference was to create a public policy organization that could help define and promote resource priorities for the entire Great Lakes region. That organization, The Center for the Great Lakes, began operating early in 1983.

A Catalyst for Developing Constructive Responses

Led by a board of directors which includes prominent academic, business and environmental leaders from around the region, the Center is charged with two responsibilities: 1) defining those resource management issues most critical to the Great Lakes region; and 2) providing concise analyses of these issues to government and corporate leaders, private citizens and all organizations concerned with enhancing the environmental and economic health of the region.

The Center is an advocate of responsible regional decision-making.

The Center provides information to decision-makers and the media on issues relating to the Great Lakes, and it serves as a catalyst for developing constructive responses to resource problems and priorities.

Specific programs of the Center include the following:

- Research on maintaining water quality in the Lakes, diversion and consumptive use of Great Lakes water, and the future of shipping and economic development in the region.
- Policy and information briefings for federal, state, provincial and local lawmakers and officials.
- Technical seminars to promote legal, scientific and management expertise on Great Lakes issues.
- Publication of ***The Great Lakes Reporter***, a bi-monthly compendium of news, analyses and Great Lakes activities.

A Model of Private Initiative

The formation of the Center has been warmly received by regional leaders in both the United States and Canada. Close ties to the region's governors and premiers, to the Great Lakes congressional delegations and to environmental and economic organizations have already been established.

The goal of the Center is to serve as an impartial, non-political analyst and institutional memory for the Great Lakes, and as an advocate of responsible regional decision-making concerning our Great Lakes resource.

The establishment of The Center for the Great Lakes represents a model of private initiative, designed to encourage the wise use of this region's most prominent natural resource.

About the author: William Milliken is chairman of the board of The Center for the Great Lakes. He served as governor of Michigan from 1969 to January 1983. He is a member of the board of directors of Chrysler Corporation, Burroughs Corporation and The Ford Foundation in New York.

A Common Voice for the Great Lakes Region

Donna Wise
President
The Center for the Great Lakes

Q: Why was The Center for the Great Lakes established?

A: The Center was established as an independent, non-governmental institution to foster programs and to forge regional alliances that will enhance our region's development and environmental protection.

Q: What makes The Center for the Great Lakes unique?

A: First, the Center, located in both Toronto and Chicago, is able to provide a truly regional perspective on Great Lakes issues. Second, with independence from government and with private funding, the Center is able to analyze both natural resource and economic issues in a truly objective manner. Finally, the Center is an institution which serves to forge a new way of thinking by regional decision-makers, one which underscores the value of the Great Lakes to the future health of the region's economy.

Q: What are the goals of The Center for the Great Lakes?

A: The Center has four goals:

The first is to have a real and positive impact on the region's commitment to improving the water quality of the Great Lakes.

The second is to assume a major role in establishing a regional water quantity management framework to prevent depletion of our Great Lakes water resources.

The third is to promote policies to ensure optimal use of the Great Lakes/St. Lawrence Seaway transportation system in an environmentally responsible manner.

The fourth is to analyze and demonstrate the interdependence of economic development and environmental issues to relevant public and private regional decision-makers.

The Center is able to provide a truly regional perspective.

The Red River Valley: Testing a "Bottom-Up" Decision-Making Process

Muriel Morrisette
Staff Writer
Freshwater Society

Can the people closest to a watershed manage it as effectively—or more so—than anyone else? Can a shared common interest transcend numerous special interests in the search for regional solutions to environmental concerns? Answers to these questions are being sought in the Red River Valley — and the answers could make the Valley a prototype for water management structures all over the country.

Rivers are notorious for having little respect for political boundaries. They cross state, national, even international borders, touching the lives of all people who live in their basins. Rivers are truly nondiscriminatory: They feed, water, transport, amuse and flood without regard to the economic status or political persuasions of the people who use—and abuse—them.

In an effort to generate a new kind of management, a bold new plan is being formulated.

One example of such a river is the Red River of the North. The Red River of the North runs the wrong way — or so it seems. It flows northward, from the point where North and South Dakota meet, to Lake Winnipeg in Manitoba.

To the people who live in the Red River's watershed, sharing its problems and its blessings, management of the Red River has been "running the wrong way," too — from the top down. In an effort to generate a new kind of management, the kind that begins at the grassroots, the kind that grows from the bottom up, and the kind that unites diverse interests, a bold new plan is being formulated.

Truly regional in scope, the Red River Valley encompasses parts of three states and one Canadian province (Minnesota, North and South Dakota and Manitoba). The present national, state, provincial and local government structures are inadequate to effectively manage the river and the watershed. Each of these structures manages its "piece of the Valley" according to its own priorities with little knowledge of the effect these decisions might have on the watershed as a whole.

The people of the Red River Valley have decided to test a more efficient process for cooperative management of the Red River Valley.

Testing a New Management Process

In spite of these differences, the various interests share the same problems. Recurrent floods, depletion and contamination of groundwater, soil erosion and the loss of wetlands and wildlife habitats are problems that cross state and national boundaries—and they affect everyone. In light of these shared concerns, the people of the Red River Valley have decided to test a more efficient process for cooperative management of the Red River Valley.

Can a watershed like that of the Red River be managed on a regional basis? Finding the answer to that question has become a project that may well be a test case to determine whether a watershed region can benefit from a watershed-based water policy, managed by those people most directly concerned. The answer may prove to be far-reaching, as concerned citizens and resource planners in regional watersheds throughout the country closely watch developments in the Red River Valley.

Initiative for the project was taken by the Red River Valley Mayors Association, formed in the spring of 1983 under the auspices of The International Coalition for Land and Water Stewardship in the Red River Valley Basin. The International Coalition, an organization of concerned citizens and public officials; was formed after the devastating floods of 1979.

"Each day our activities impact the future," stated Lance Yohe, president of The International Coalition. "This impact can be helpful or it can be harmful. In both cases, we have a choice to make — today. How we make this choice in the present regarding our land and water will determine the future of these valuable resources."

A Five-Phase Plan

To get the project started, a five-phase plan was developed and put into action. The first two phases identified all of the Valley organizations, groups and individuals, and determined their interest in analyzing and modifying the present water management structure. The third phase analyzed the findings of these initial phases and determined that interest appeared sufficient to cooperatively develop a watershed-based, regional water management structure.

Early cooperation was evident even in terms of funding and cosponsoring. The first phase was cosponsored by the Hubert H. Humphrey Institute of Public Affairs, the Freshwater Foundation and the Association of Minnesota Counties Research Foundation; the second phase by matching grants from the Freshwater Foundation and the Ford Foundation; and the third phase by the Bremer Foundation, the Freshwater Foundation and the University of North Dakota at Grand Forks.

Interest appeared sufficient to cooperatively develop a watershed-based, regional water management structure.

The First Water Summit Conference...

The Red River Valley International Water Summit Conference, held in Grand Forks, North Dakota, in December 1983, was the fourth phase of the project. It was sponsored by the Mayors Association and The International Coalition in cooperation with the University of North Dakota. Financial support came from a number of foundations as well as local public and private groups, and many other local groups provided public information, technical advice and organizational support.

The conference called for a Valley-wide commitment to 1) address water concerns on a scale that matches the problem — a Valley-wide scale; 2) provide continuing policy direction from within the Valley; and 3) form a family of both public and private interests to build a water policy structure.

Of top priority to conference organizers was the creation of a setting for water management that would promote cooperation and make it possible to get things done. Did they succeed? A Canadian participant called the meeting "democracy at its best." Another participant said, "I've been going to water meetings for fifty years . . . and there's something different here that we've never had. There's more than just one interest here, and we're getting along." People who had not communicated before, did. Others were elated at the new experience of "having a voice."

"If you can, **mandate**. If you can't, **legislate**. If all else fails, **cooperate**."

... and a Second Water Summit

A resolution passed at the end of the first Valley conference requested a reconvening within one year. The Second International Red River Valley Land and Water Summit Conference, held in Grand Forks in December 1984, built on the efforts of the first conference and expanded the theme of cooperation with respect to The International Coalition's roles of consensus-building and supporting increased communication among government agencies.

Small groups brainstormed, and their suggestions evolved into long-range goals and 1985 action plans endorsed by the entire coalition. "In a confrontation, everybody loses. In a compromise, everyone has a chance to win," stated Dr. Joe Rossillon, president of the Freshwater Foundation. "If you can, **mandate**. If you can't, **legislate**. If all else fails, **cooperate**. And that is what this conference was all about."

This second conference, based on a spirit of cooperation, further focused on the critical role of the process that is developing in the Red River Valley. "Conciliation. Consensus building. That's what this process is about," said Dr. Paul Dovre, president of Concordia College. "Interdependence is our keynote here. This is a people-oriented water-basin. That's why we're here, and it's why we are forging a process—so that we can take care of each other."

"This second conference was a milestone," stated President Lance Yohe. "The participants were willing to go beyond the general concepts of the first summit. They were willing to move into the difficult arena of 'What to do.' "

"Interdependence is our keynote here."

The Work Ahead

The answer to the question of what to do emerged from the two-day conference as a list of five long-range goals and a 1985 action plan for each of these goals. The five goals focused on the following areas: 1) education; 2) water management and control; 3) water quality and quantity; 4) land management; and 5) research and review.

The five goals focused on understanding and action. The education goal, for example, is to "provide more education for the general public and policymakers." The water management and control goal is to "better understand and work with the structures that develop policy."

"Yesterday's 'sure solution' may no longer be right today."

The 1985 action plan for each goal outlines specific steps to be taken within this year, in an initial, measurable effort to move toward the attainment of the long-range goals. The time for discussing concepts is over; the time for taking action has begun.

The final proposed phase of the project has two elements. The first is to present the Red River Valley experience to Washington and Ottawa as a prototype for watershed-based management. The other is to proceed with work already begun in the Red River Valley region.

"We are learning here in the Valley," said Dr. Royce Hanson of the Hubert H. Humphrey Institute of Public Affairs, "that yesterday's 'sure solution' may no longer be right today. We are beginning an internationally important experiment in a human decision-making process."

In the Red River Valley, this process of looking at water management in a new way continues to grow—from the bottom up.

Muriel Morrisette is a staff writer for the Freshwater Society.

Attaining Water Resource Goals: Looking to the Private Sector

Thomas A. Reilly
Vice President, Public Finance Department
Thomson McKinnon Securities, Inc.

In the face of federal grant cutbacks, privatization is emerging as a viable alternative to federally run water projects. Private financing, ownership and operation of water projects can be a cost-effective and efficient approach to meeting present and future water resource goals.

Until recently, the campaign to improve and protect the quality of our nation's water has been directed by engineers, scientists, environmentalists and government officials. Today, things have changed, and investment bankers are the new kids on the block.

Constructive partnerships of government and industry can help solve the "infrastructure crisis," particularly at the local level — the level at which the issues of water supply, wastewater treatment and waste disposal must in the end be solved.

Today we have to look at water quality improvement and protection from two perspectives: 1) What water quality standards do we want to attain and maintain? and 2) How will we pay for it? The first question is substantially a policy issue, to be addressed by the local and national policy-making apparatus. The second question is decidedly practical: Where will the money come from?

Where will the money come from? We know one place where it won't come from—the federal government.

Federal Cutbacks

We know one place where it won't come from — the federal government. Federal water quality grant programs have been severely cut back. With this cutback has come a corresponding falloff in state matching grants, with fewer federal funds to match. This trend has stopped many projects, slowed down others, and generally left state and local governments at a loss: While they still have to meet tough federal water quality standards, they've lost many of the financial resources they have become accustomed to.

These federal cutbacks are not "bad" or inappropriate. Clearly, they will help solve the federal government's serious budget problems. Further, we could all make a strong argument for a policy which states that those who create water quality problems at the local level should be the ones to solve them, and that those who benefit from a service should be the ones to pay for it. The cutbacks are not inappropriate if we can offer states and localities a reasonable substitute, one which will enable them to finance and develop water quality projects at the lowest possible cost.

There doesn't seem to be much point, however, in setting high objectives and tough water quality standards with one hand while, with the other, we take away the financial ability of states and localities to meet them. If projects can't get built, the standards won't be met, and we will all suffer. Federal and state budgetary problems will pale in the face of the local health, environmental and economic problems that a further decline in the quality of our water will create.

Federal and state budgetary problems will pale in the face of the local health, environmental and economic problems that a further decline in the quality of our water will create.

Looking to the Private Sector

Norco, California, needs to build an entire new sewage collection and treatment system. Scottsdale, Arizona, needs to build a water treatment plant if it is to benefit from new, desperately needed water supplies from the Central Arizona Project. Palm Beach, Florida, needs to develop a resource recovery project so that it can close several landfills that are polluting the county's water supply, which is literally only feet beneath the surface. These projects all have two aspects in common: 1) they affect water quality; and 2) since none are eligible today for federal funds, they are looking to the private sector to play a significant role in solving their problems in the most cost-effective way.

Other examples abound across the country of substantially lower service costs reflecting the tax benefits earned by private service providers. Cost savings of at least 25 percent can typically occur with private ownership and operation rather than traditional public works development — a direct savings to the residential and business users of water quality projects.

With all the talk of the "infrastructure crisis" — roads, highways, bridges, water and sewer systems, public buildings — water quality projects, particularly, lend themselves to private sector involvement. Every day, industry tackles projects that are analogous to water quality facilities: the design and construction of increasingly sophisticated facilities that process materials; the 24-hour operation of these facilities; and, day in and day out, the pressure to meet tough budgetary and performance requirements. Also, of course, industry regularly takes on the financing of such facilities and the operations and business risks associated with them. Industry's involvement in the financing, construction and operation of water quality projects is "a natural."

While the federal grant cutback may be seen by some as a problem, it should also be viewed as an opportunity — an opportunity for the public and private sectors to work together in new ways to solve problems that mutually affect them. This is "privatization."

An Opportunity To Work Together

While the federal grant cutback may be seen by some as a problem, it should also be viewed as an opportunity — an opportunity for the public and private sectors to work together in new ways to solve problems that mutually affect them. This is "privatization."

The necessary components are in place to allow privatization to occur. Localities seem willing to "privatize" whenever possible, for both budgetary and operational reasons. What better position to be in than that of taking advantage of lower-cost private development of a traditional public service and demanding and getting guaranteed performance? Further, the private sector can do the job; it sees privatization as an attractive long-term business opportunity. Finally, the investment banking community is ready to help localities structure privatization financings, using low-cost tax-exempt debt to produce the lowest possible service costs to homeowners and businesses — the end-users of any water quality project. We're all prepared to build facilities and systems to achieve and maintain our nation's water quality goals in the most cost-effective way.

What is needed to encourage privatization is something really quite simple: a hospitable climate at the federal level. What is needed are incentives in both sectors to privatize.

The Key: Incentives

With these components in place, what is needed to encourage privatization is something really quite simple: a hospitable climate at the federal level. What is needed are incentives in both sectors to privatize. This means consideration of the clearly public-purpose nature of water quality objectives and projects. This means exempting the projects from constraining limits on the use of tax-exempt debt. It also means federal income tax incentives, such as investment credits and depreciation allowances. Such incentives will make it attractive for industry to invest in — to finance, own and operate — water quality projects. Such incentives will also encourage localities to privatize because these tax incentives will be passed on as lower service charges to the residential and business users of projects.

In return for these tax incentives and for the business of operating facilities and providing services, the private owners/operators will be willing to take substantial risks. The greatest of these will be their guarantees that 1) the plants will perform as intended, with controlled, predictable costs; and 2) the purpose of the plants — the improvement and maintenance of water quality — will be met. That should be the ultimate objective.

It is understood that every tax incentive results in a revenue loss to the federal government. National tax policy, however, usually reflects national social policy. If we have a social policy of striving for high water quality, then perhaps our tax policy should support that effort.

Without Privatization: Delays and Higher Costs

If we can't privatize, can we still finance water quality projects? Of course. As we do now, in the absence of federal grants, we can continue to use 100 percent tax-exempt financing by localities and local authorities, and the investment banking community will continue to underwrite these large debt issues. It will, however, be markedly more expensive. Each tax-incentive loss will be felt directly, with every monthly bill, by homeowners and local businesses — the users of the projects.

If we have a social policy of striving for high water quality, then perhaps our tax policy should support that effort.

Another negative effect will occur too. Because of the greater expense, communities will hesitate and postpone action, waiting until "next year," always hoping for "something cheaper" or for a bailout. Or they will take half measures and stop-gap actions, all inexpensive but also inadequate. The result will be continued delays in meeting the primary objective of the improvement and preservation of water quality.

Privatization is a sensitive issue. If we focus, however, on the prime objective — water quality — both the issue and the direction we should take can be made clearer.

We can "have it all." We can have a user-pays principle; we can eliminate direct federal subsidies; we can realize cost-effective development and operation; and we can meet our national water quality goals. Privatization — an opportunity for the public and private sectors to work together in new ways to solve mutual problems — can help make it happen.

About the author: Thomas Reilly has over 22 years' experience in tax-exempt financing, the last 15 years of which have been spent as a senior officer for two major Wall Street investment banking houses. Since 1982, Mr. Reilly has successfully completed the financing of over $1.7 billion in water and sewer capital improvement projects and has spent the last two years developing appropriate programs to bring private industry into the ownership, construction and operation of water and sewer system projects.

Excerpted from "Financing the Solutions to Water Quality Problems," a paper presented to the National Water Alliance at its Lake Geneva symposium in March 1986.

Leasing the Colorado River: San Diego County and the Galloway Proposal

Interviews with
Phillip W. Ray
Executive Vice President
The Galloway Group, Ltd.

and
Lawrence Michaels
General Manager
San Diego County Water Authority

The role of the private sector in the domain of public resource management is expanding. This expansion brings with it opportunities for the entrepreneur to chart new territories for private enterprise. The proposal by the Galloway Group to lease Colorado River water to the San Diego County Water Authority exemplifies the questions being raised regarding the intent, the legality and the implications of such innovative "water deals."

Testing a Non-Traditional Idea

San Diego County is looking for water. The Galloway Group, a Colorado-based corporation, proposes to provide them with what they want. This apparently logical exercise of the law of supply and demand has, however, set much of the West on its collective ear.

San Diego County's continued water supply from the Metropolitan Water District of Southern California (MWD) is threatened by the activation of the Central Arizona Project, which will allow Arizona access to its court-granted annual allocation of 2.8 million acre-feet of Colorado River water. This "re-allocation" will decrease Southern California's—and the MWD's—current Colorado River allotment by up to 60 percent.

The MWD's search for alternative supplies has led to such political frustrations as the defeat of the proposed Peripheral Canal, which would have tapped Northern California's water supply. In the meantime, the San Diego County Water Authority foresees a tenuous future water supply in drought years ahead — an uncomfortable situation for one of the fastest-growing areas of the country.

The Galloway Group has proposed to build a dam on the Yampa River (a Colorado River tributary), capture the water in a large reservoir and sell it to San Diego County — assuring the area an additional supply of 300,000 to 500,000 acre-feet per year for the length of a 25- or 40-year lease. San Diego County would be happy. Galloway would be happy.

The possibility of an interstate water market is being tested.

But it's not that simple.

Questions relating to this proposal to lease Colorado River water make for more than polite conversation these days in the West. Opinions—educated and otherwise—regarding the advisability, legality and even morality of such a proposal seem to be strongly in favor or strongly in opposition.

The many opposing viewpoints do seem to agree at least in general on one thing: implications. The implications of selling water at market value in the West — or anywhere — are great indeed. Proponents embrace the idea while opponents shudder at the thought.

The outcome of the Galloway/San Diego agreement is far from being determined. The legal and political complexities appear insurmountable. But the possibility of an interstate water market is being tested, and the results of that test could chart a new course for water management in the West — and everywhere else as well.

In the two following interviews, Phillip W. Ray of the Galloway Group and Lawrence Michaels of the San Diego County Water Authority share some of their views on the Galloway/San Diego agreement.

"It's an Idea Whose Time Has Come"

Phillip W. Ray
The Galloway Group, Ltd.

Q: Why is Galloway proposing to lease water to San Diego?

A: Galloway is in the resource development business. Our agreement with San Diego is just part of an overall strategy of looking at various types of resource development for private enterprise.

Very simply, God didn't put water where people want to live. Our research shows that there will be serious water supply shortfalls by the year 2000 in many places along the Colorado River.

God didn't put water where people want to live.

Besides out own research, many government reports and private studies have indicated future serious water shortfalls. These problems are being accelerated by such things as the Central Arizona Project, which will affect both the Metropolitan Water District (MWD) and San Diego.

The warnings have been there for some time, but they have been basically ignored. No one has been doing much long-range planning.

The federal government has stated that it will no longer provide funding for water supply, so states have had to begin to look elsewhere to satisfy the needs of a demanding West. We at Galloway see the leasing of water in the West as an idea whose time has come.

Q: Should private enterprise enter the field of water supply?

A: Our extensive homework says yes. Whether you're selling water or widgets or hula hoops, the process is the same. You need a demand, and a demand with an ability to pay. That's San Diego. You need to identify the resource needed and find it. We've done that. You need to develop the resource. We plan to do that. And it all has to be done within legal bounds. We've done our homework, and we're convinced we can do it—despite the views of those along the River who continue to ignore the fact that a free market water system exists and that its continuation is inevitable.

To think that water is free — or should be — is nonsense.

Q: The Galloway proposal seemed to come out of nowhere. How did it happen so fast?

A: It hasn't happened the way it was planned. We contacted the San Diego County Water Authority in May of 1984. We believed it would take about two years to work with them to develop an acceptable agreement.

They had just completed studies, however, that told them what we had already discovered about their water supply future, and they had just been informed by the MWD that their supplies would be curtailed. So they were ready to go when we came in the door.

Starting in May, they dug in and researched our concepts and became satisfied that it was "do-able." It took only until August 29 — less than 100 days — to get an agreement and a relationship worked out. It all happened in a remarkably short amount of time.

The only negative aspect of their responding so quickly was that we had planned to have that one to two years to lay some other groundwork — public relations, talking with the other states and so forth. We were planning on the opportunity to educate people to realize that our proposal could be an adjunct and an assistance to all parties involved.

Instead, the announcement was made on August 29, and it burst on the scene like a bombshell. People came out within 48 hours with opposing positions and some very strong statements. It's tough to back off from such statements once they're made. Now, half a year later, as people are beginning to understand the details of the proposal and our efforts to protect all parties involved, many of them are trying to find a graceful way to "turn around" — and some of them already have.

Q: Is what you're proposing to do within the law?

A: Yes, what we propose does meet all regulations, and it is within the law. We have spent a great deal of money assuring ourselves of that, and studies conducted within the other states have come up with the same results.

We have spent $1.3 million in legal fees. Not only **should** our proposal go through, it **will** go through. It can be done, from all angles and aspects.

We're trying to provide large volumes of water with private capital. The federal government won't do it, and the states can't. If the private sector won't meet the challenge, who will?

The Colorado Legislature has just introduced a severance tax of $50 per acre-foot on water exported from Colorado. Why would they have bothered to propose such legislation if they didn't believe that the opportunity to use it was going to present itself?

Negative opinions exist, of course. But instead of looking at the negative aspects, it would be nice to have people look at the positive implications of what's involved. That approach is already being taken in some quarters.

Q: You propose to lease water. Shouldn't water be free?

A: Of course not. Water has never been free. It's just that, historically, its costs have been buried. To think that water is free—or should be—is nonsense.

Let's look at today's water systems. To supply water to people you need: 1) a raw supply of water; 2) storage capacity; 3) a means to get it where it's needed; 4) a treatment facility; and 5) a distribution system.

We're in the raw water supply business. Historically the costs for raw supply, storage and transportation have been buried, either in treatment charges or in ad valorem taxes. But, buried or not, the costs have been there—and they've been rising dramatically.

Look at the costs of other commodities over the years in any major Western city. Since 1930, the cost of a loaf of bread has gone from maybe a nickel to more than a dollar today. And look at gasoline costs as another example. Yet, if you look at water, there has been no corresponding increase in the cost of a commodity whose related costs have gone up exponentially. The artificial cost being maintained is ridiculous.

The rules for the Colorado will never be the same. You simply cannot stop an idea whose time has come.

Q: Is what you're doing a good thing?

A: We're trying to provide large volumes of water with private capital. The federal government won't do it, and the states can't. If the private sector won't meet the challenge, who will? Yes, I think we're doing a good thing.

~~Of course~~ there's the question of our making a profit at it. Making a profit — a fair and reasonable profit in relation to the risk involved—is not wrong. It's what this country was built on.

I've been charged by my stockholders to see that everything we do is within the law and is also in the best interests of both the company and the public. What else can we do?

Q: What will the Galloway proposal mean for the future of water?

A: First, we will have represented a bringing together of ideas and concepts which will place water resource development on a more realistic and financially sound base, at least relative to the Colorado River.

Second, we will have led the way in getting much greater interstate and intrastate cooperation in resource development.

Third, we will be able to show that one of the basic tenets of our country still works: that private enterprise can solve problems that government can't..

Finally, we will have set the stage for others to do the same.

Q: If this particular proposal isn't successful, will the concept die?

A: This proposal will work. The group is too dedicated and involved to back off. The project is being pursued with firm resolve, and I don't think we can be stopped.

Q: And what if the Galloway Group were to drop over dead today?

A: Someone else would do it. The rules for the Colorado will never be the same. You simply cannot stop an idea whose time has come.

"There'll Be an Economic Incentive To Conserve"

Lawrence Michaels
San Diego County Water Authority

Q: How did the original idea for the Galloway/San Diego proposal come about?

A: San Diego County imports 90 percent of its water supply. The Metropolitan Water District (MWD) projects that, by 1990, it could be short by one-third in a drought situation. That means that we in the San Diego area would be short, too.

Other supplies are being developed, but some have failed, such as the Peripheral Canal. Certainly we need to continue working to develop state water projects, but we're still going to need a short-term supply for the interim time period. When Arizona begins drawing water under the Central Arizona Project at the end of 1985, California's water rights will be reduced.

People protected by existing conditions see change as a challenge.

Only a firm supply has any real meaning, but, in this case, we need to look for alternatives for this critical time frame during which we continue seeking permanent alternative supplies. As we began discussing the seriousness of the situation, the San Diego County Water Authority became the potential customer that a group like Galloway needed, and they contacted us.

Q: Is this proposal legal?

A: In the West, first in time is first in right. Therefore, allowing uses to develop naturally in the Lower Basin should actually be considered more threatening than this short-term lease contract. We're trying to say, "It's going to be used in the Lower Basin anyway, so the existing situation is really riskier than what we're proposing." We're just formalizing the kind of thing that's going on all the time anyway.

People are beginning to realize that there may be an economic benefit in not using their water.

The Law of the River didn't expect this situation to come up, so it isn't provided for. But it also isn't expressly prohibited. Beginning with the 1922 Colorado River Compact, the Law of the River has continually been developed and modified due to needs or, in some cases, lawsuits. It's flexible. Of course, people protected by existing conditions see change as a challenge. But the Law of the River has always been a developing law, and this is just one more step in the process.

MWD's position is that the proposal is not legal. Their position is correct to the letter of the law. Galloway, however, is looking for a new opportunity. With that attitude in mind, there are "holes in the document."

There are two different ways of reading the existing documents: in defense of them, and in seeking opportunity from them. The legal questions of course aren't fully answered. They need to be pursued. And that's what's happening here.

Q: What are the chances for the proposal?

A: My advice to my board of directors was that, from an engineering and economic standpoint, it has all the elements of a feasible program. Legally, however, I can't speculate. I can see that there are legal questions that have not been resolved and that they're now working to resolve them.

I will say that the Galloway Group is spending a lot of money on this. Apparently they think it has a good chance of going through.

Once there's an economic incentive to conserve, more supplies will "appear," and the price will go down.

Q: If the proposal is carried through, what will be the long-range implications?

A: I wouldn't pretend to be able to answer that. It does mean that San Diego would be assured of a water supply for the next 25—or 40—years.

Once this whole market situation starts, though, people will begin to sell water rather than water pasturelands. Already people are beginning to ask, "Should I continue to irrigate my pastures for a few horses, or should I sell my water for $100 per acre-foot?" We're already receiving calls reflecting this sort of thinking. People are beginning to realize that there may be an economic benefit in **not using** their water.

There'll be an economic incentive to conserve that does not exist now, and water use will never be the same.

Once you change from "I have rights" to looking at the other alternatives of use for a water supply, you begin to raise the question, "Which proves to be the best return as a use for that water?" Once it's decided that "I can lease this water **anywhere**," then we'll never again return to the way things have been done up until now.

It is not, however, so gloriously simple as it sounds. The Arabs learned that an open market tends to produce low prices. If Galloway is the only one leasing water, the price may be high. But we think that a lot of water is poorly used because there is no opportunity to encourage conservation. Once there's an economic incentive to conserve, more supplies will "appear," and the price will go down.

And that's what's important. There'll be an economic incentive to conserve that does not exist now, and water use will never be the same.

Phillip Ray and Lawrence Michaels were interviewed by Linda Schroeder, editor.

The Case for Water Markets

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Water users can afford to be wasteful only when water is cheap. Allowing water to be assigned a market price may prove a powerful incentive to begin to view water as the valued resource that it is.

A new crisis seems to be descending on us. *Newsweek* warns that "drought, waste and pollution threaten a water shortage whose impact may rival the energy crisis." Photographs of dried-up water supplies, sinkholes the size of football fields and rivers that catch fire illustrate the magnitude of the problem. Memories of the Dust Bowl still linger and we are forced to wonder: Are we running out of water? Is a crisis inevitable?

In economic terms, a crisis exists when the quantity demanded is greater than the quantity available and when there is little time to adjust either. This is exactly what the energy crisis was and what the water crisis is likely to be. But why does quantity demanded exceed quantity supplied?

"Cheaper Than Dirt"

The ***New York Times*** quoted Abel Wolman, an expert on water supply, as saying, "Water is cheaper than dirt." Indeed, nowhere in the United States do water prices come close to reflecting water's true scarcity. In Southern California, where water is in short supply, Los Angeles residents pay only 60 cents per 1000 gallons; in contrast, people in Frankfurt, Germany, pay $2.80. It is not surprising, therefore, that per capita consumption is 180 gallons per day in the United States and 37 gallons per day in Germany.

What is seen as waste is simply a user's rational response to low water prices. Users can afford to be wasteful only when water is cheap.

To make matters worse, prices are lowest in the arid Southwest, where residents of El Paso and Albuquerque, for example, pay 53 cents and 59 cents, respectively, per 1000 gallons. This compares with $1.78 in Philadelphia and $1.00 in Boston. In many cities the real price of water has fallen in recent decades despite the threat of shortages.

Agricultural users who consume most of the water in many Western states also face extremely low prices. Throughout the United States, the price for irrigation water ranges somewhere between 9/10 of one cent and 9 cents per 1000 gallons. In California's Central Valley, the average price in 1981 was $5 per acre-foot, or less than 2 cents per 1000 gallons, even though supplying an additional acre-foot of water costs $325. A 1980 Department of Interior study showed that government subsidies covered between 57 and 97 percent of the costs of water projects.

To get a more accurate price signal will require changes in the laws that govern water and the creation of an effective water market.

A Market Rate for Water

Pricing water at market rates could help solve the water crisis. Water consumption — whether for industrial, municipal or agricultural use — is very responsive to price changes. What is seen as waste is simply a user's rational response to low water prices. Users can afford to be wasteful only when water is cheap.

To get a more accurate price signal will require changes in the laws that govern water and the creation of an effective water market. The water crisis can be ended by changing restrictive laws and relying more on water markets. Creating new institutions is not necessary. The doctrine of prior appropriation can be salvaged and used to encourage conservation and good management, but for it to work, many of the restrictions on water transfers must be removed.

When the diversion and use of water cannot be changed, higher-valued alternatives are forgone at a cost to both the water owner and society. The resulting "use it or lose it" principle takes away most incentives to conserve. And when transfers are restricted to beneficial uses set by legislatures, some potential gain from trade will not be realized.

If Northern California water owners could sell their rights to Southern California municipalities, for example, it is likely that water with low value in agricultural use would be shifted to municipal uses with higher values. The irrigators who sold their water would have an incentive to consider alternative irrigation technologies and cropping patterns.

Incentives To Conserve Groundwater

Solving the problem of mismanagement of groundwater supplies requires more imaginative institutional reforms. In groundwater basins, pumpers ignore the impact of their pumping on others. Like two children drinking from the same soda, each pumper has an incentive to get the water out before the other does. There is little incentive to leave the water for future use.

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As each pumper draws down the water level in the basin, pumping costs for everyone else increase. Again, the incentive is to pump the water as rapidly as possible, before pumping costs rise. To try to prevent these problems, legal restrictions have been placed on pumpers, but these restrictions have not promoted efficiency or equity.

It is possible, however, to assign appropriable rights to groundwater. A property deed could be issued for some amount of water to each water user. The deeds would set the holder's right to both a percentage of the basin flow and a percentage of the water stored in the basin. The specific percentages could be allocated in proportion to the individuals' pumping rates during some base period. Pumps would have to be metered, and at the end of each year adjustments would have to be made to the individual's water account by subtracting the amount pumped and adding the appropriate share of aggregate natural recharge.

Existing water policies have not promoted efficiency, equity or environmental quality.

Allowing a Private Water Market

As the scarcity of surface water and groundwater increases, privatizing the commons offers hope for getting the highest value from these resources. The real problem in creating a private water market is in getting from here to there. There is little hope that politicians will actively support the decentralization of water policy. They and the water policy bureaucrats work within a system that gives them the discretionary power to reward their constituencies.

Existing water policies have not promoted efficiency, equity or environmental quality. By understanding the potential for market allocation of water resources and the current governmental failure in the allocation of those resources, we can see how to resolve our institutional water crisis: greater reliance on markets.

About the author: Dr. Anderson is professor of economics at Montana State University. He is author of ***Water Crisis: Ending the Policy Drought***, editor of ***Water Rights: Scarce Resource Allocation, Bureaucracy, and the Environment***, co-author of several other books and author of numerous articles on economics and natural resources.

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Water Conservation in Phoenix: The Impact of Individual Initiative

An Interview with John F Long
President
John F Long Homes, Inc.

Action to encourage water conservation can be initiated by federal guidelines, by statewide programs — or by one individual. Private initiative, based on a commitment to living in balance with a desert environment, is the foundation for an effective conservation effort in Phoenix, Arizona.

John F Long, a homebuilder for close to 40 years, is concerned with the future water supply of Phoenix. Integrated into the homes he builds are such conservation-minded features as water-saving devices, water recycling systems and drought-resistant landscaping.

The results? While the average Phoenix resident uses 240 gallons of water per day, an individual living in a John F Long home uses 53 gallons per day — 78 percent less water than the average Phoenix resident.

Long has strong feelings about weather cycles in the deserts, the effect on cities, and our shared responsibility to ensure a future water supply. He exemplifies how private initiative, based on concern for our limited water resources, can do much to encourage greater awareness of the need to conserve water supplies. In this interview, he shares his thoughts about the need to conserve our water resources.

We all have the responsibility to preserve and maintain, conserve and recycle our limited water supplies — for ourselves as well as for the generations that come after us.

Q: What is the general response of people to the water-saving devices and techniques featured in your homes?

A: It's pretty positive. The public — at least in Phoenix — is becoming increasingly aware of our growing water problems. Homebuyers look favorably upon these devices because, for one reason, they know that water is going to cost more in the future. Our water conservation features attract a homebuyer in the same way that good insulation did after the 1973 oil embargo.

I also think response is positive because, as people realize that water conservation doesn't have to affect their lifestyles, they're more than willing to conserve.

We use drought-resistant plants, for example, in our landscaping—plants native to the Southwest. So many people think that cutting down on outside watering means growing cactus. It's not true, and we're able to show them that they can have a beautifully landscaped yard and conserve water at the same time.

The answer to our problems — both here and throughout the country — is conserving and recycling.

Q: What motivated you to begin promoting household conservation?

A: We live in a desert area. In this desert, our water supplies are limited. Yet we are overdrafting 2 million acre-feet of water per year from the aquifer. That just doesn't make sense.

Our company has been involved with research and design for years. When it became obvious that our water supply was becoming a problem, we began to focus our interest on coming up with reasonable solutions to these growing water supply problems.

We're also interested in what's best for the city as a whole. I live here, my company is based here, and I have a vested interest in Phoenix. The life of any city is forever — beyond that of any one individual or generation. We all have the responsibility to preserve and maintain, conserve and recycle our limited water supplies — for ourselves as well as for the generations that come after us.

The answer to our problems — both here and throughout the country — is conserving and recycling. John F Long Homes is just giving people an opportunity to do it now.

Q: How much of an effect does in-home conservation really have on the overall problem?

A: First of all, in-home reduction of water use can be substantial. A 30-40 percent reduction is not unusual. For the homes in which we reduce per-person use from 240 gallons to 53 gallons, we're accomplishing a 78 percent reduction in water use.

The benefits of in-home conservation go far beyond the home, though. If we reduce our in-home use of water by 30-40 percent the city's treatment plants will have to process 30-40 percent less wastewater. Less water used means fewer new wells to be drilled and fewer new—or expanded—facilities related to the production of potable water.

There is no need for us to wait for a crisis. We can make corrections and adjustments right now. The technology is available today. We don't have to reinvent the wheel — we just have to use it.

Q: Are public awareness and concern regarding water problems increasing?

A: Yes. In a survey we conducted of people living in Phoenix, we discovered that 87 percent of the people realize that there is a water problem and that the price of water will escalate. This increased awareness is due in part to the increased frequency of articles about water problems and pollution and in part to initial increases in water rates that are being put into place.

Also, several wells in the area have been closed due to contamination — and 60 percent of the Phoenix water supply comes from groundwater. So people are getting concerned.

Q: What is the basis for water problems in Arizona?

A: Two things. First, we live in a desert, and our water supplies are limited. Second, our allocation of water from the Colorado River, determined by the 1922 Colorado River Compact, was based on an annual supply of 18 million acre-feet from the Colorado. These estimates, however, were based on the wettest 20-year period in 400 years. The annual average supply is something closer to 13.5 million acre-feet.

Based on the figure of 18 million acre-feet, Arizona was told that, although we're last on the list to receive water, there'd be "plenty for us anyway." With only 13.5 million acre-feet actually available, there isn't necessarily "plenty for us anyway."

We're finding that people aren't reluctant to conserve; they're reluctant to change their lifestyles. If we can provide them with opportunities to conserve that don't involve changing lifestyles, they'll be willing to do it.

Q: What about the Central Arizona Project? Won't it provide sufficient water for Arizona?

A: The Central Arizona Project has been played up as the answer to all of Arizona's water problems. Some believe it; some don't. The situation is that Arizona will be at the end of the receiving line for CAP water. When there's plenty of water, we'll get some. When there's a drought, we won't get any. It'll be like being given an umbrella when the sun shines and having it taken away when it starts to rain. We'll have the water when we don't need it, and we won't have it when we do need it.

You don't win elections by telling people bad news.

Q: So the Central Arizona Project won't be the answer to Arizona's water problem?

A: That's right. The problem in Arizona is that we're using — wasting — more water than we have available to us. We can definitely get by on less, if we're just aware of the need to do so.

We can use our water more carefully. There are a lot of conservation techniques and devices that don't have to alter our lifestyles. Using a three-liter toilet instead of a five-gallon one will not change our daily lifestyles, but it will conserve water.

By conserving in these effortless ways, we can avert a crisis in the coming years, a crisis that could begin to affect our lifestyles dramatically. If we don't face up to the issue now, the time will come when we'll have to accept drastic changes that will have a severe impact on our lifestyles.

There is no need for us to wait for a crisis. We can make corrections and adjustments right now. The technology is available today. We don't have to reinvent the wheel — we just have to use it.

Effluent, for example, can be treated to a level that makes it reusable for human consumption. Let's hope we don't have to do that, but the point is that we can. The technology is there. All we have to do is decide how to proceed and then get on with it.

Q: What will it take to get people to conserve?

A: Awareness. We've developed a talking water meter that verbally reports every four-gallon increment of water that's used. Such a device encourages people to take shorter showers and to wash larger loads of clothes or dishes.

We need to become more aware of our water problems — aware enough and willing enough to work with our policymakers to develop long-range plans.

We're finding that people aren't reluctant to conserve; they're reluctant to change their lifestyles. If we can provide them with opportunities to conserve that don't involve changing lifestyles, they'll be willing to do it.

Q: Can government help in some way to encourage conservation?

A: It can provide incentives to conserve water, patterned after energy incentives. Retrofitting, for example, should be encouraged in some way.

Some cities are beginning to offer incentives to builders. They'll reduce sewer and water connection fees to homes equipped with in-home conservation devices and systems.

Cities could undertake a program to retrofit all water-related fixtures in all homes. In Phoenix, that would cost approximately $20 million — a lot of money. But, one year ago Phoenix expanded its sewage treatment plant at a cost of $34 million. If we had retrofitted instead, maybe we wouldn't have had to expand the sewage treatment plant. And maybe we'd have to drill fewer wells. Again, the effects can be far-reaching.

We have to face up to the fact that we're wasting a nonrenewable resource.

Q: Why are we all — individuals as well as policymakers — so intent on not thinking long-term?

A: Our policymakers are not encouraged to think or act long-term. They're usually elected to a two- or four-year term. As they look ahead to an upcoming election, they understand that you don't win elections by telling people bad news. To tell the voting public that you have a 20-year plan that won't provide them any direct benefits — but it will raise their taxes — won't win many elections.

It's not the politicians' fault, though. We voters haven't been begging to hear the bad news. We don't really want to be told that we haven't been living within our means, that our deficits continue to grow, and that we'll have to do something about it. We need to become more aware of our water problems — aware enough and willing enough to work with our policymakers to develop long-range plans.

The only limit to solving our water problems is our imagination.

Q: So what do we have to do?

A: We have to keep in mind that scientists have developed artificial oil and artificial food, but they haven't figured out how to make artificial water.

We have to face up to the fact that we're wasting a nonrenewable resource. If we don't face that reality, we're going to have some serious problems.

We have to begin to use our water realistically, by conserving and recycling. The technology is available now to do whatever we decide to do.

The only limit to solving our water problems is our imagination. If we are sincere in our concern to move forward earnestly and imaginatively, our water problems can be solved.

John F. Long was interviewed by Linda Schroeder, editor.

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